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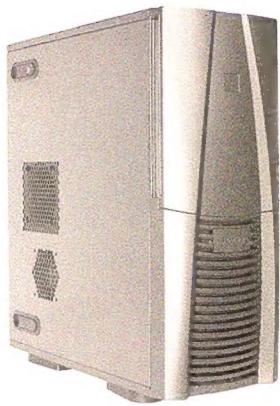
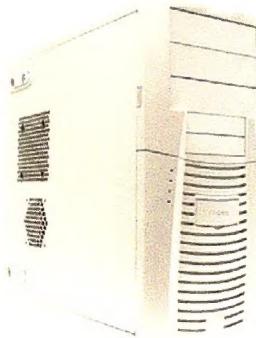
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56



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# Performance TX



Model	TX635	TX640B	TX1050B	TX1088AMG
Case Type	Mini Tower	Mini Tower	SOHO File Server	SOHO File Server
Case Colour	Beige	Black	Black	Antec Metallic Gray
Case Dimensions	43.8 (H) x 20.5 (W) x 47.2 (D) cm	43.8 (H) x 20.5 (W) x 47.2 (D) cm	52.3 (H) x 20.6 (W) x 47.2 (D) cm	52.3 (H) x 20.6 (W) x 47.2 (D) cm
Power Supply	Smart Power 2.0 350 W	Smart Power 2.0 400 W	Smart Power 2.0 500 W	True Power 2.0 480 W
	ATX12V v2.01	ATX12V v2.01	ATX12V v2.01	ATX12V v2.01
Drive Bays	8	8	10	10
Cooling Capacity				
- Rear	1 x 120mm TriCool (standard)	1 x 120mm TriCool (standard)	1 x 120mm TriCool (standard)	1 x 120mm TriCool (standard)
- Front	1 x 80mm (Optional) Front	1 x 80mm (Optional) Front	1 x 80mm (Optional) Front	1 x 80mm (Optional) Front
- Chassis	1x 92mm (Optional) CPU Duet 1 x 80mm (Optional) VGA	1x 92mm (Optional) CPU Duet 1 x 80mm (Optional) VGA	1 x 80mm (Optional) HDD 1x 92mm (Optional) CPU Duet 1 x 80mm (Optional) VGA	1 x 80mm (Optional) HDD 1x 92mm (Optional) CPU Duet 1 x 80mm (Optional) VGA

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# JOIN THE VOIP REVOLUTION!

## OUT WITH THE OLD

There's a new kid in the telephony town, and it goes by the name of VoIP. It sounds like something made for the corporate world, the truth is that it can benefit everyone, from mums and dads through to gamers – if cheap, or even free, local and international phone calls sound good to you, then read on!

## IN WITH THE NEW

For over 100 years now we've been using POTS (Plain Old Telephone System) that uses copper wires to transmit voice and recently data. It's an old and mostly reliable technology. This wonderful ability to communicate globally comes at a tangible price though. While local, STD and international calls are cheaper now than they've ever been before, there is a better and cheaper service coming, and it's even more ubiquitous than POTS.

This is why VoIP is, right now, very hot. Using the power of structures like the internet you can – with the right

hardware and software – call just about anyone anywhere in the world for just a few cents.

## HOW IT WORKS

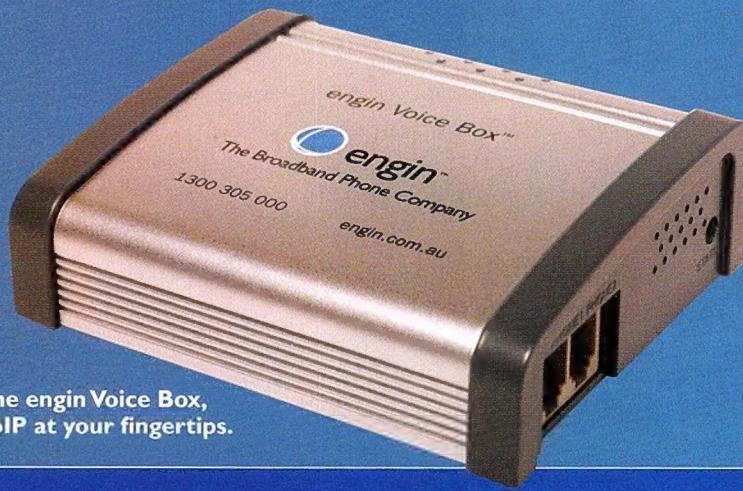
Instead of sending voice through the conventional Public Switch Telephone Network, or PSTN, voice can be encoded and transported via internet protocols. It's almost identical to sending an email except the information isn't text, it's voice. The quality of the voice can be the same (and sometimes better) than what you get over the phone.

What this means is that your telephone service provider is taken out of the picture. Technically, you haven't placed a call with your provider and hence are not charged for the call. Many calls that you would make over PSTN that cost money are almost always cheaper over VoIP (to the point of being free), depending on which VoIP provider you're with. This is especially true of international calls.

In fact, chances are you've already used this technology without realising it. Many phone calls over PSTN are already sent via the Internet, at least for part of their journey.

## VOIP FOR ALL

One question you might be asking yourself now is whether or not you can call a non-VoIP phone with a VoIP-enabled phone. The answer to this is yes – for the most part, VoIP is completely transparent to the user. Even better, getting VoIP at home or at the office can be as simple as plugging a box into your existing phone line. An always-on broadband connection is just that – a permanent connection to the outside world. So, it makes little sense to create a new connection every single time you make a phone call when a perfectly good connection is already there.



The engin Voice Box,  
VoIP at your fingertips.

**The Broadband Phone Company**

# Using the power of the internet you can – with the right hardware and software – call just about anyone anywhere in the world for just a few cents.

## LEADING THE PACK

engin is Australia's leading broadband phone provider. It supplies VoIP hardware and services for businesses and consumers. These services include a massive range of options for controlling how phone calls are handled, and includes everything from diverting calls to your mobile to blocking calls, voice email, call screening and much more. To this end, engin provides easy-to-use hardware to put VoIP into your hands quickly.

### engin Voice Box 1

The Voice Box allows your normal phone to make VoIP phone calls. It converts your call from a standard phone signal into a digital one, ready for transmission over the Internet. With the ability to customise calls, save money and the capability to work seamlessly with any type of phone (corded, cordless, etc) it is the definition of VoIP – easy, quick and transparent.

### engin Voice Box 2

The successor to the Voice Box, the Voice Box 2 provides an even more flexible VoIP service. The Voice Box 2 can be contacted remotely to allow cheap calls anywhere in the world, a fallback mode to PSTN in case your Internet connection fails and the ability to receive PSTN and VoIP calls with one phone, engin's Voice Box 2 gives you total control over your phone.



The engin Voice Box 2, fully featured for advanced VoIP users.

# WIN FREE PHONE CALLS FOR A YEAR!

That's how cool VoIP can be – especially with engin. Not only can we replace your service provider for any phone calls, but we can do it for cheaper as well. Interested in trying before you buy? No problem! We're offering, exclusively for Atomic readers, the chance to win your own VoIP service with engin for one year – all free! This fantastic package consists of:

**1 x engin Voice Box 2 valued at \$229  
1 x one year subscription to engin valued at \$360**

(That's a free \$29.95/mth service fee for 12 months which allows the user to make \$25 of overseas or mobile calls or 250 national and local calls each month)

**And there are THREE of these prizes up for grabs!**

#### Terms and Conditions of Entry.

The promoter is engin Pty Ltd of 431 Warringah Road, Frenchs Forest NSW 2086. This is a game of skill, chance does not enter into it. All entries will be judged and the winner contacted via email on the 14/9/05. Entry is open to residents of Australia. Management and employees of Haymarket Media, engin and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. Enter by emailing the required information or posting forms to engin at atomiccomp@engin.com.au or to the above address. The draw will be held at the offices of engin at 5.00pm on 14.09.05. The prizes are not transferable or exchangeable. The judges' decision is final and no correspondence will be entered into. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. All entries will become the property of engin.

#### How to enter:

Answer this question: **Describe in 25 words or less what impact engin's VoIP service may have on the Australian Telecommunications industry.**

Email your answers to: [atomiccomp@engin.com.au](mailto:atomiccomp@engin.com.au)  
With the subject header: **Engin Atomic Competition**  
Include your name, address, and a contact phone number.  
Competition closes 13/9/05

## two > one

I remember when I got my first 3D card. It was an Orchid Righteous 3D, based on the Voodoo 1. I plugged it in, piped it through my Tseng ET6000, and almost fell off my chair at how silky smooth Quake had become. It was absolutely gorgeous.

It started a passionate love affair with 3D accelerated graphics for me that persists to this day (come on, you know exactly what I'm talkin' bout). There hasn't been a single machine of mine since without the goodness of a 3D card. Or, sometimes, two of them. 3dfx pioneered SLI, and though no longer with us, I tip my hat to them for the difference they made to 3D gaming.

Today, there are only two major players left in the video card market. Tseng, Trident, Number 9, and even S3 have all faded into obscurity. Only NVIDIA and ATI are really left. And it's good we have at least two major players in the field, because aside from massive great wads of cash, competition is a great innovator.

Last year, NVIDIA released SLI. This year, ATI fires back with CrossFire. Who will dominate the dual-GPU market? No one knows, yet. But you can bet we'll benchmark and report on each and every development as it happens.

Speaking of which, 7800 GTX cards are flooding the market, so look out next month where we'll have a special *Atomic* labs roundup of the best. Right now they're hotter than pancakes, but we've yet to see ATI's R520 and the visual gourmet it will bring. The speed crown consistently shifts, and if the R520 is to tackle the 7800 GTX, it's going to have to be a beast of a chip.

But for now join me and raise a glass to 3dfx for starting it all, and to NVIDIA and ATI for keeping it all going. And then, sit back and watch the fireworks in the SLI punch ups. Round one is on us!

And don't forget – on the back of the Subscriber card on page 99 you'll find your free Green Code for *Atomic* website access.

Enjoy!

Ashton Mills

[amills@atomicmpc.com.au](mailto:amills@atomicmpc.com.au)



**SSH! Silent power supplies**  
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035

**Make your own iMac Mini.**

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**Antec P180**

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**Dungeon Siege 2**  
Hardcore co-operative RPG action at its best!

094

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## **COVER STORY ▾**

# Dual Graphics Showdown

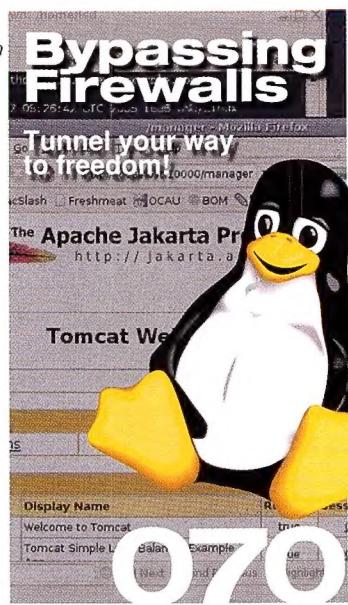
**SLI and CrossFire battle it out. But which one is for you?**



052

# **Hotbox of the Year!**

058



Welcome to Tomcat  
Tomcat Simple Example  
Balaji  
Next Page  
Home Page

# Blazingly Fast Memory



044

# this month

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Information, just the way you need it. Delectably digestible.

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## TECHNIQUE

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Games are good. You know it, and we know it. Enjoy them here!

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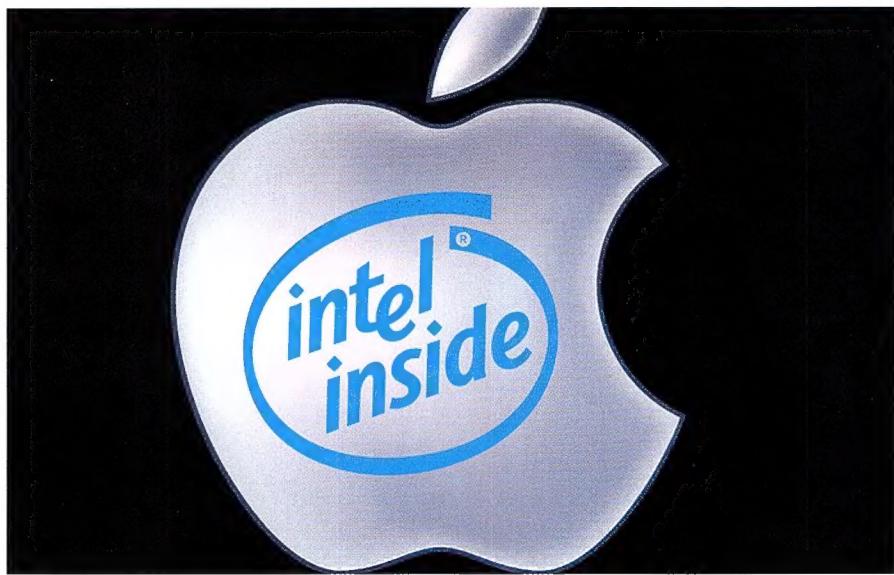
INTERACTIVE

Atomic is more than a mag, it's your mag. Join in with us here.

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# update

Tech news you can't live without. Seriously, it's that awesome.



## The end of PowerPC

**James Wang** reports on Apple's bold new future.

It's true, said Steve Jobs. Starting from next year, Apple will switch from PowerPC to Intel-based processors. If you're not an Apple user, you may be wondering what the fuss is all about. This change will once again turn the Mac upside down as software gets rewritten and emulation is employed everywhere else.

Apple has been touting its PowerPC architecture for over a decade. However, processors based on the design have clocked consistently lower than Intel's Pentium processors. But, thanks to a more efficient architecture and the inclusion of a powerful SIMD unit called AltiVec, PowerPC CPUs are able to greatly accelerate media applications. The end result is that Apple's computers have been perceived by outsiders as slow (due to low clockspeed) while Apple fans, mystified by CEO Steve Job's captivating keynotes, believe their PCs are the fastest on the planet. This will all change as Apple moves to Intel.

The most obvious issue is the lack of AltiVec support on Intel CPUs. Having full control over the hardware has allowed Apple to strongly push developers to exploit AltiVec. Moving to Intel will mean this advantage is essentially lost. Performance for AltiVec optimised applications may very well degrade when moved to an Intel system. While Intel's SSE extensions have capabilities that mirror much of AltiVec, its performance is much lower. Various developers on SIMD Tech ([www SIMDtech.org](http://www SIMDtech.org)), a website promoting SIMD programming, have commented that Intel's SIMD performance per clock is less than half of that offered by AltiVec.

The main disruption of this transition will be software. All the software compiled for PowerPC will need to be recompiled for Apple's Intel architecture in order to work. As this is nontrivial, Apple has included a transparent emulator called Rosetta to emulate

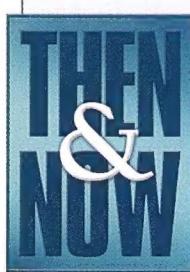
old software. Apple will also be mandating its developers to use a new version of XCode that can compile programs that work on both PowerPC and Intel x86.

With these issues and the general nuisance of switching architectures, one must wonder why Apple would do such a thing. According to Jobs, the main reason is that Intel offers a much more compelling roadmap than IBM. The key metric he used was performance per watt. A 3GHz PowerMac was promised two years ago but IBM has yet to deliver. Apple's popular PowerBooks have also stagnated due to power problems. Jobs has said Intel's future CPUs would offer many fold performance per watt compared with PowerPC.

Anyone who has followed Intel's past two years will find this deeply ironic. It is after all the Pentium 4 that failed to reach 4GHz due to power problems and was cancelled as a result. Of course, Jobs is not talking about the Pentium 4 when he speaks of Apple's future, he's talking about Intel's future CPUs; whatever Intel has in its pipeline, it must be fast as well as cool. This is good news for PC and Mac users alike.

The big picture in all this is that for the first time, Apple and Microsoft will both be running their operating system on Intel's hardware. Barring intentional sabotage, there will no longer be technical barriers to dual booting Windows and OS X. However, the freedom won't be total. Apple has said that it will only allow OS X to run on its own Intel machines.

That said, it won't prevent users from installing Windows on its machines as well – and early indications from developers is that it doesn't. This gives Apple an immense selling point – Apple computers will allow the use of OS X and Windows at the same time while other vendors can't. Perhaps Apple has finally found the magic formula to make Windows users, 'switch'.



### #003 Sound cards

Someone once said something at someplace about sound. Or something. The evolution of PC sound is the same. How far has it come?

1981

#### PC speaker - tone generator

Believe it or not, the mutant beeps emanating forth from this speciality device were once considered 'hot shit' back in the day. Then someone decided to innovate.

### Adlib - FM Synthesis

Adlib produced the first mainstream sound card ever made. It offered a new age of synthesised sound by layering waveforms, albeit in mono. And started a revolution. Check out the rear volume knob!

1987



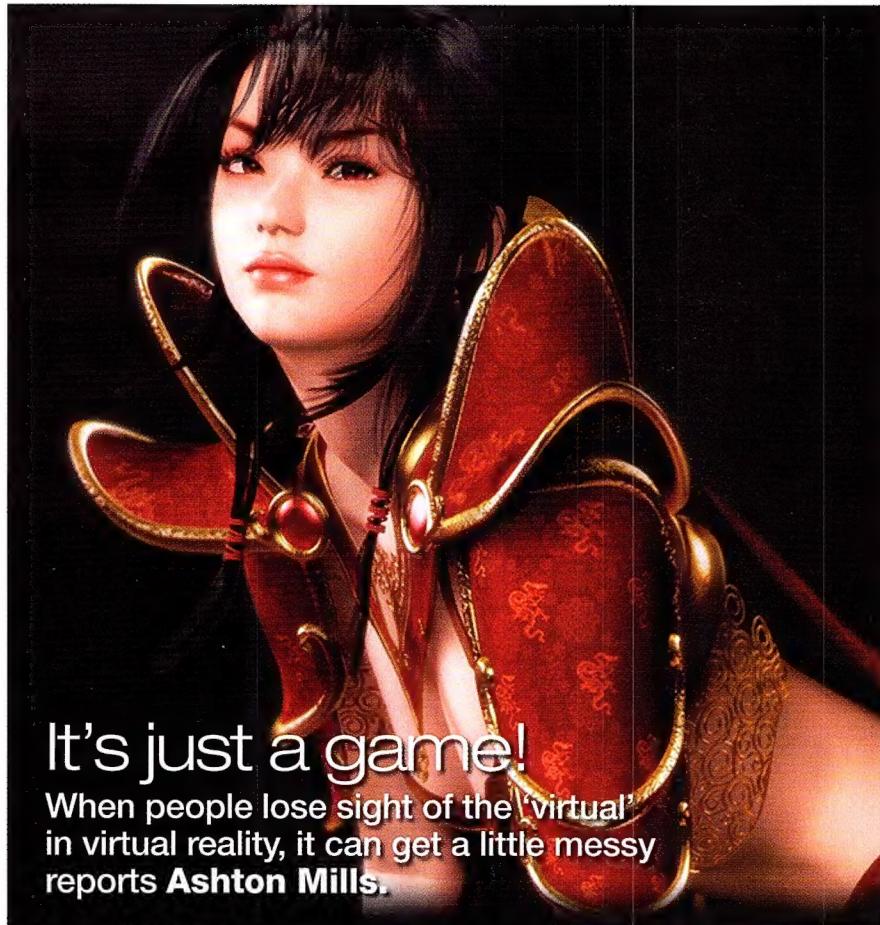
### Sound Blaster - multiple voices

Creative took the idea and ran with it, creating a household name in the process. The original Sound Blaster sported 11 voices, and quality so good it made gamers swoon.



1988





## It's just a game!

**When people lose sight of the 'virtual' in virtual reality, it can get a little messy reports Ashton Mills.**

Somewhere in our genetic pool there must be a gene for 'f\*cked up' because along the line there are members of our race seemingly unable to separate fact from fiction.

Last year we heard about the Counter-Strike inspired killings in Korea, and in the United States before that. For some losing at a game seemed unacceptable, and violence was the answer.

Now, while weddings are nothing new in the world of MMOGs, divorces certainly are. And messy ones at that. According to a report in the Chongqing Business Post, a Mr Wang of Chongqing, China, decided he didn't love Ms Ye, the woman he married in the game Legend of Mir 2, and wanted a divorce. The pair met while playing Legend of Mir 2 last year, and married four weeks later.

They also accumulated a number of high level characters and items between them, and in a case of art unfortunately imitating life, the two made claim to these virtual items and were disputing over them in their e-divorce.

Wang has made his ability to hold onto reality quite clear – he's willing to give Ye full ownership of the apartment they now share if she hands over ownership of their characters and items in Legend of Mir 2. Ye however wants to split both apartment and virtual gear 50/50, and in an attempt to settle the dispute lawyers have now become involved.

Clearly the legal disclaimers we all click through to enter our MMOGs will need a warning added, something along the lines of 'Objects in the screen are closer than they appear, and have no basis in reality...'

## short circuits

**Microsoft has officially launched its beta program for Windows Longhorn, a good sign that the operating system is in its final stages of development. Initially only selected beta testers are involved, but it's expected Microsoft will open this up to public beta testing at a later date. Look out for *Atomic*'s take on this next-gen operating system.**

**Patents are messy territory.** On the one hand, they protect innovation. On the other, they can crush it. While already a mainstay of US law, software patents don't yet exist in Europe, and thankfully are unlikely to for the foreseeable future after a recent vote by the European parliament rejected a directive that would see software patents introduced. The Directive on the Patentability of Computer Implemented Inventions was thrown out after receiving 648 votes for the rejection to 14 against, with 18 abstentions.



**Radically unlike our own TV stations,** the BBC in the UK seems to have a rather large clue to the future of content distribution, the power of the open source development model, and what the internet is really all about. The well established television station recently made available all the open source projects it has initiated, including its powerful Dirac video compression software that will likely be used for streaming TV in the near future. Check out [www.bbc.co.uk/opensource](http://www.bbc.co.uk/opensource) for more info.

### Gravis Ultrasound - wavetable

The Ultrasound with its 32 voices was the first sound card to sport onboard RAM and use waveform patches to create awesome life-like music. Creative's Sound Font technology on the Sound Blaster was no match. And neither was Gravis, in the end.



### X-Fi - The future

The future of PC sound belongs to Creative. The X-Fi promises faster FPS in games, remixed HQ audio, and more accurate surround sound. Sex!



1991



### Aureal A3D - 3D surround

Birth of 3D surround sound, the Aureal Vortex series of chips gave rise to a dream of 3D spatialised sound. Gamers wet their pants in awe. And then, like Gravis before it, Aureal succumbed to the Creative behemoth.

1997



### Creative Audigy - crystal clear

One by one they fell as Creative's Sound Blaster line culminated in the Audigy, the greatest card to date. With superior audio quality, EAX for gaming, and more voices than you can poke a choir at, the Audigy is this shiznit.

2001

2005



# short circuits

The days of the humble BIOS are numbered – for some time now there's been the Linux BIOS project ([www.linuxbios.org](http://www.linuxbios.org)) aimed at bringing a fast, open source BIOS to PCs complete with instant-on kernel, but now the big name players including AMD, Intel, HP, IBM and Microsoft are getting together to design the next-generation BIOS for PCs and compatibles. Called the Unified Extensible Firmware Interface, or UEFI, the new specification is set to replace the standard PC BIOS, one of the last legacy technologies from the dawn of PCs. No news on when we'll start seeing UEFI in the wild, but here's hoping it still allows us to overclock our machines.

**T**here's more than one way to skin a cat, and probably about fifty gazillion ways to hack into Windows. One of these is even through the USB port, thanks to a flaw in Microsoft's USB drivers. SPI Dynamics, which discovered the security vulnerability, reported a specially programmed USB device can cause a buffer overflow in the drivers and gain administrator access to a machine. The bug apparently affects all 32-bit versions of Windows, including Windows XP and Windows 2000.

**F**irst Brooke Burke, and now Josie Maran. EA has found its next super hot babe for the new Need for Speed title, called Need for Speed: Most Wanted, and boy, is she wanted. Everyone at Atomic HQ approves of the choice – even Bill the designer! – now let's hope the game is actually, you know, good.



## What's in an ad?

Quite a lot it seems, says Ashton Mills.

**F**ull motion ads are nothing new to us in the real world, but they may soon be invading the virtual one as well. Some games have already played with static ad placements blended into the game environment, but Massive Inc, a company founded in the industry of ad placement in games, is set to deliver the ability for full motion ads with sound in a gaming title near you. Just what we've all been waiting for.

So far the company has been trialling the internet streamed ad delivery technology in the MMOG Anarchy Online. The technology allows ads to be changed and withdrawn whenever the advertiser wants, and could be an attractive prospect for Hollywood studios wanting to promote movies prior to the week

of release. Massive Chief Executive Mitchell Davis said some studios had shown interest in running 15-second movie trailers in online games, and that while the technology can work for consoles no deals had yet been signed to do this yet.

With PC and console gaming occupying more time than TV for the majority of young males today, it's clearly a smart business move to tap that market for advertisers.

The obvious question remains – will gamers be bothered standing still to look at an ad for 15 seconds in the middle of their game, and just how will they react to such advertising? If it makes a MMOG's subscription cheaper, it could be an interesting development. One way or another, we're sure to find out.

## I want my ABC

**P**atrick Gray reports on a new move to Podcasting.

**I**f your iPod's pirated music collection is getting a little repetitive, help is on the way thanks to Australia's very own auntie, the ABC.

The public broadcaster now offers programs via 'podcast'. By using software like Apple's iTunes, netizens can download ABC radio programs on to their iPods automatically.

Currently, 16 Radio National programs are available through podcasts.

The ABC launched a trial service in May that now sees over 120,000 programs downloaded every week, a number that's rising rapidly. 'We quickly realised it's the future. It's a permanent service now,' says Radio National program manager and podcast boffin Gordon Taylor.

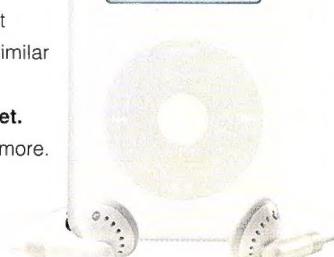
Science programs have proved to be particularly popular, Taylor says, but don't expect to bop along to your favourite Triple J tunes anytime soon. Copyright restrictions

make pod-casting music a legally sketchy proposition.

'We've been very careful not to include music programs because of the [copyright] issues,' Taylor says. 'We can't do much more with Triple J until the rights issues with music are worked out.'

The BBC has taken things a step further, launching a content trial that includes television programming. UK residents can download TV and radio programs to watch whenever they want, and the ABC hasn't ruled out doing a similar trial here.

See [www.abc.net.au/rn/podcast](http://www.abc.net.au/rn/podcast) for more.



A dramatic, high-contrast portrait of a woman's face, which is partially obscured by a ring of fire. The fire is intense, with bright orange and yellow flames framing her features. Her eyes are visible through a narrow slit in the flames, looking directly at the viewer with a serious, intense expression. The rest of her face and body are hidden in deep shadow.

S H E   I S   T H E   Q U E S T I O N



Strong violence,  
coarse language

RESTRICTED

# short circuits



**Robots may soon be performing** breast examinations, albeit with the help of a remote operator wearing a glove with an ultrasound and movement sensors and guided by three video cameras. Furthermore, the operator is also fed a simulated 'touch' sense to give the helpful illusion of contact. Mmmmm...

**Bill Gates has recently stated** he's not at all interested in cybernetics – even though he has said that one day computer implants will be possible... and that his company owns a patent to the conductivity of the human body. When asked about brain implants, he said he's happy to have it '...over there while I'm over here.' Bizarre.

**Japan is building its own army** of robots to patrol the streets, for next year. Dubbed 'Guardrobo D1', this chunky 109cm-tall robot will alert human guards via video footage to problems such as crimes and fires. Next step, Robocop.

## TOP 5 ...reasons why your spouse hates your love of PCs.

- 5 When dinner is postponed because that 'pansy with the AWP' needs to be taught a lesson, knife-style.
- 4 For your short-sightedness that makes it impossible for you to recognise your partner outdoors.
- 3 The fact you'll sacrifice their seat in the car if it means bringing an extra PC (and player) to a LAN.
- 2 When they discover it's where the other 95 percent of your disposable income goes.
- 1 They can't understand why you'd delve into an instance dungeon for sweet, sweet booty – instead of them.

# future

Quenching your thirst for the latest technology and hardware



## The quantum challenge

**Nathan Davis takes on the quantum industry, and explores where it's leading us.**

**Q**uantum computing has more issues than we originally bargained for. Long has quantum computing continually promised to essentially spike computing power to an incomparable high. Assuming it's a finite number, think of this power in terms of being able to calculate Pi (3.141592...) in a split second. Quantum computing can also ensure complete and utter security in data transmission, with the data essentially being destroyed the instant an unauthorised party tries to view it.

So far, the networking/security side of quantum computing isn't what's coming under attack. In fact, several such networks have already been built for testing. What has arisen, however, is an issue with storing and keeping the data in a solid state qubit (the shortened term for 'quantum bit' and is the carrier that stores and transmits the data) for long enough to calculate – this means quantum processors are coming under heavy fire.

Known as 'coherence', this is what keeps the data in qubits cohesive. The problem of late is that physicists have discovered an odd phenomenon where this coherence simply disappears. Funnily enough, research is underway to see if this is what is really happening.

This news comes in as HP's R&D department announces its discovery of a new type of qubit. In order to use quantum computing, one must tap its power via a classical physics channel, such as using electrons. HP is working with light, or photons.

Now generally speaking, photons don't interact – or for that matter, easily do so. This is why optical fibre can have multiple signals

being pulsed down the line without cross-interference. In the case of quantum computing, qubits must be capable of interacting with each other. Of course, as you may know, odd things happen in the quantum world and everything out of the norm is the case right here.

In this model, photons are embedded with the data. Individual laser pulses in turn act as negotiators between photons by first interacting with one, then the other, in order to work its freaky magic and entangle the two photons. This creates a binding interaction between the two photons that can then carry out their duties. Usually the problem with checking the state of entangled qubits leads to their annihilation, and thus, the loss of the data they were carrying. HP however has developed this system so that only the laser pulse is destroyed, with the photons entangling via this process.

The neat thing about this model is that the underlying system is not solid state. This means that both computing and networking can use the same system, hence theoretically an even faster backbone with less need for convertors. Imagine sucking down files from the other side of the world as fast as you would on your local machine. This is also particularly useful for distributed computing, with data being physically disconnected, yet directly linked together through entanglement for computation.

If the problems with the solid state quantum computing don't carry over to this new optical method, or at least a work-around can be found, we could one day be playing games with negative pings, no load times and with access to wads of linked computational power. Or at least start with zero latency – I think we can handle that.

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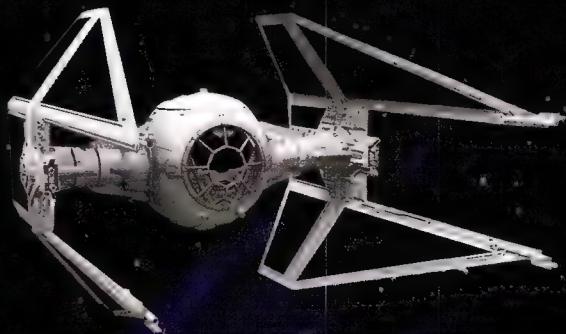
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OCTOBER 2005



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## Galaxies apart

**Can a revamp of a flawed system save an aging MMORPG? Tim Dean runs the numbers, but comes up short.**



**F**or a game that, if pushed, I'd have to say I dislike more than I like, I seem to write a whole lot about Star Wars Galaxies. That's not to say there aren't things I've enjoyed about SWG, it's just that the parts I don't like elicit a certain bitter disappointment that greatly overshadows the likable bits.

The last time I played SWG was early 2004, at which point I decided that a directionless game based around grinding to reach a point where you could grind no further wasn't worth my time – and I subsequently cancelled my subscription. Sad, because the environments in the game were rich, the population of players friendly and helpful, and the game system expansive, if flawed.

However, I recently came across some surprisingly glowing reports about changes that have taken place in the SWG world. First of all, the game now includes all the basic features it should have offered when launched – namely vehicles, space travel, Jedi and a functioning galactic civil war. Even more interesting is the total revamp to the combat system, called the Combat Upgrade, or CU.

SWG originally had a complex and idiosyncratic, if flawed, system that worked around three basic stats: health, action and mind – hence the name for the system, HAM. It was odd in that the three stats were each targetable, which lead to intricate strings of special attacks devoted to focusing on damaging one stat in order drop your opponent faster. Players spent months fine tuning their attacks, and carefully selecting certain professions and combat skills to maximise their damage output.

In a way, its complexity was both its strength and its weakness. In a game where role playing was so strongly encouraged, people spent a great deal of their time looking at numbers and 'min-maxing' their stats.

So, the developers decided to do something incredibly bold – change everything. The Combat Upgrade was intended to simplify matters, and make different combat professions complementary, such as

in World of Warcraft, where there are tanks, healers, DPS monkeys, debuffers etc. In general, this is a sensible bit of game development.

However, most of the casual gamers had already walked away from SWG, and only the hard core were left. Unfortunately, not that many casuals have come into the game because of the CU, while many of the hard core – who stayed around because they liked the complex HAM system – were disenfranchised and have now left.

I actually fired up SWG again the other day to see how the CU has changed things. First off, the biggest change I noticed was not in the game mechanics, it was in how few other players there are still in the game. Areas that used to be teeming with players are now empty open spaces. Beyond that, after a bit of tooling around, I got to see how the CU actually handled. Overall my impression of the system is positive. It's definitely an improvement on the HAM system – specifically because it's been thought out logically from the ground up to be a good gaming combat system.

On the other hand, I do feel implementing the CU now is a mistake. If SWG was released today, with all the buzz that surrounds such an MMO release, it would surely be a bigger success than it was – it's now a pretty decent game. But too little too late is not a way to wind back the clock and bring people to your game.

Sadly, the only ones left in Star Wars Galaxies are the hardest of hard core, and I must say, from my experiences revisiting the game, they are pretty amazing people. They are so keen to share their love of the game with you that they go out of their way to make things fun for you, and I have a lot of respect for them for this reason. Wish I could say the same about most WoW players...

Tim's source of power is his hair, and he knows it.

[tim@atomicmpc.com.au](mailto:tim@atomicmpc.com.au)



**It's just  
that the parts  
I don't like  
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## Adrian David Cheok

**Stuart Ridley talks with Mixed Reality Lab's Adrian David Cheok about being in two places at once, petting chickens over the Internet and the future of bi-directional physical stimulation'. Ooh yeah!**

Every time we play games we attempt to immerse ourselves into an alternative reality (virtual/hyper/whatever) that's *briefly* more stimulating than most things immediately real. Adrian Cheok is an expert in the field.

**Atomic:** You've explored some fairly far out mixed reality ideas already – what with your Internet Chickens, Human Pacman etc – so where is this all headed? What's the Holy Grail?

**Adrian David Cheok:** The Holy Grail will be when we can see the augmented virtual 3D objects in our real world without wearing HMDs (such as true animated 3D holography), or something so small that it is worn on our eyes like a contact lens.

Then we will truly reach the augmented reality that was seen in the original Star Wars movies, such as Princess Leia's hologram saying 'Help me Obi Wan Kenobi' and the chess game played with little monsters moving on the board.

This is the dream of what I hope augmented reality will be like sometime – such a realistic merging of the real and virtual world which can be seen with basically bare eyes.

**Atomic:** Which is more challenging for you – thinking of concepts for meaningful interactions or developing the technology to make them happen?

**Adrian:** In my personal case it is developing the technology which is most challenging because

it needs so much time, experimentation, heartache, and headaches. In all technology projects early prototypes will not work, blow up, go wrong... this is the normal part of making a research prototype.

Thinking of concepts is what I find very enjoyable, whenever I come up with an idea I will write it down on paper, or a note on my phone or my computer, depending on where I am. I find ideas will come in so many different places...

**Atomic:** Of all the projects MRL has worked on so far, which was the most rewarding in terms of the challenges you faced and the experiences enabled? (Personally I love the idea of playing a human Pacman game...)

**Adrian:** Before Touchy Internet I think the most rewarding MXR projects were the 3D Live / Magic Land as well as the Human Pacman. Both have made a wide impact, and it brings us joy when non-tech people use our systems and say it is really cool. Human Pacman and Magic Land were both selected in the World's Top 100 High-impact and Visionary Technology Works to Be Showcased In Wired NextFest 2005, Chicago USA ([www.nextfest.net](http://www.nextfest.net)).

**Atomic:** There's quite a buzz worldwide about your Poultry Internet – not just about the tech innovations but also because it's ostensibly an animal welfare project... so how do the live

## atomicbio

Name **Adrian David Cheok**  
Occupation **Scientist**  
Websites [www.mixedrealitylab.org](http://www.mixedrealitylab.org)

Adrian David Cheok is Director of the Interaction and Entertainment Research Center, incorporating Mixed Reality Lab, Nanyang Technological University in Singapore.

He is Associate Professor in both the Schools of Computer Engineering and Art, Design, and Media.

Before joining MRL, he worked in real-time systems, soft computing, and embedded computing in Mitsubishi Electric Research Labs (Osaka, Japan) and NUS.

His research to date has covered mixed reality, human-computer interaction, wearable computers and smart spaces, fuzzy systems, embedded systems, power electronics, and multi-modal recognition.

Four of his projects have already received external funding – all from the Defense Science Technology Agency Singapore – in the area of wearable computers and mixed reality.

The research output has included numerous well-received academic journal papers, research prototypes to DSTA, numerous demonstrations including to the President and Deputy Prime Minister of Singapore, CNN / CNBC television worldwide broadcasts, and international invited new media exhibits such as Arts Electronica.

chickens in this experiment respond to being remotely petted? And how different was the bird's first reaction to stimulation via the body suit to later reactions when it was more used to the technology?

**Adrian:** The chicken turns its head to the side where it is being petted. That means, if the vibrator on the left side of its body is activated, it turns its head to the left.

We made observations long enough and concluded that initially the chicken behaved that way, as expected. However after several prolonged vibrations at different parts of its body, it seemed get used to it. It did not behave restlessly such as keeping turning its head. So we could say that the chicken was not irritated by the vibration.

**Atomic:** What's does it 'feel' like to pat a chicken remotely... is there some kind of two-way sensation?

**Adrian:** The human hand does not get any force or haptic feedback from the chicken. By touching the avatar doll, the hand activates the touch sensors hidden inside the body of the doll, because she or he is touching a physical doll, which promotes the feeling of touching a real tangible object.

We do have a feedback mode, but this is on the owner's foot. The chicken owner will feel a tingle in his left leg when the chicken moves its own left leg. We put sensors on both chicken legs to sense its muscle activity. As the chicken walks, the muscle activity is picked up. On the

owner side, he will feel tiny stimulation on the corresponding leg.

The purpose is to have a close interaction between the chicken and the owner. The owner can touch the chicken remotely, and conversely, the chicken is able to stimulate its owner. This is a bi-directional physical stimulated interaction.

**Atomic:** Hmm... what other uses might there be for 'bi-directional physical stimulation' ...?

**Adrian:** Another immediate application we have thought of was that in the 'remote dance shoe'. Students learning how to dance can wear that special shoe which will stimulate their muscles while their dance teacher moves her legs.

So it will give a physical, tangible cue as when the next leg movement will be. The basic technology behind the muscle stimulation is quite simple. If you've used those massage gel pads then you'd know what is going on. Very small and low frequency voltage is applied

remotely petted it for 10 minutes. If it entered the blue door, we did not pick it up and just let it do what it was doing – no remote petting. This was repeated many times and it was found that most of the time the chicken would choose the red door. Thus we can hypothesise at least there is no negative or bad feeling of the chicken by using the body suit, and most probably it is a feeling of poultry happiness.

**Atomic:** Some people would like to see an evolution of your work on Poultry Internet to a future technology for tele- (or remotely-) operated pleasure devices – how might the technology evolve to make that possible?

**Adrian:** ...Although we are not allowed to deal with too much pleasure because we are a Uni Lab. However, what IS in our research pipeline is something quite of similar nature.

We call it a 'Children's Internet hugging pyjama'. It is a special pyjama that will let the

will respond by turning its head to the left, and thus the camera view will show whatever the dog sees. This is useful in deploying animals such as dogs in dangerous places, or even battlefields where human life is at risk.

**Atomic:** What's next for Mixed Reality Lab?

**Adrian:** I am very interested now in developing social and physical interactive media for elderly people. Elderly people are a growing part of our society, but almost no computer games or digital entertainment is made for them. I think physical and social computer games will be very beneficial for elderly people because mental, physical, and social stimulation is essential for elderly health.

So in this aim we are currently working on a new physical and social interactive game called Age Invaders.

The gameplay involves the players competing against each other in a physical

**This is useful in deploying animals such as dogs in dangerous places, or even battlefields where human life is at risk.**

across the cable of the gel pad, which is pasted on the human skin.

**Atomic:** What were some of the technical issues raised during your research into Poultry internet and how have you overcome them?

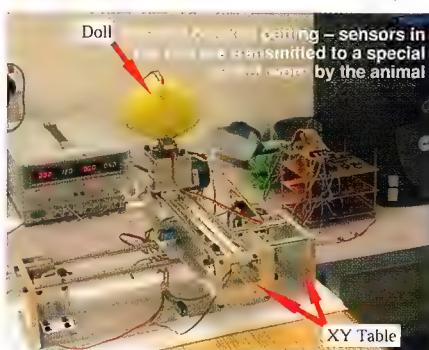
**Adrian:** The most challenging part is to find out whether the chicken prefers being remotely petted. The chicken doesn't talk, so it is pretty hard to tell whether it feels pleasurable wearing the body suit.

There are established scientific tests to prove a chicken's motivation to pleasure and avoidance of bad feelings. Avoidance of bad feelings can be tested when the animal is allowed to choose between certain aspects of its environment and assume it will choose in its best interests and welfare.

We carried out the test like this: the chicken is put inside a small cage, which is interlinked with a two-partition cage with a push door, one coloured red and one blue. Each cage contained the same food and water. Over a period of time we placed the chicken in the small cage... if it entered the red door it would be picked up and we put the body suit on it and

children feel being hugged (with the contraction of the suit) remotely. Nowadays many mothers and fathers are away from the home on business trips. With our technology they can read a bedtime story through the internet to their children and then give them a hug.

We will also design a special haptic suit for police dogs. In this way the police or security officer could remotely touch a remote dog through the internet and signal the dog what to do. A camera attached on the forehead of the dog will give the officer a more visual feel of what is happening in the environment under surveillance. For instance, while the officer touch the left side of the doll, the dog



gameplay environment. Their position is tracked in real time and a large electronic game board that appears like a big electronic display is beneath the players. Thus, in real time as the players move and shoot rockets or bombs it will appear that it is physically coming out of their bodies, which gives a real time link between the real world and the virtual world.

This concept is an attempt to bring the traditional video game Space Invaders into the physical world. In addition to visual perception, the participants will interact with the game space, which involves mapping the participant's location into a virtual environment.

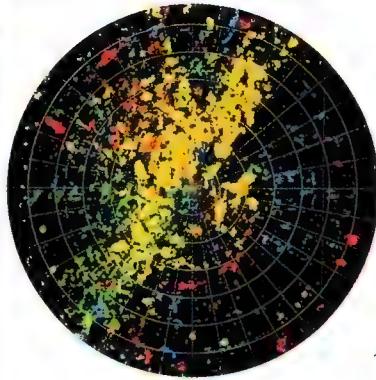
Current computer games don't encourage physical body movements nor physical and social interactions between people.

Research has shown that for social creatures such as humans, physical interaction and human presence are essential for enjoying life. Hence it is essential to bring back social and physical interaction, which is lacking in current entertainment systems.

**Atomic:** Do androids dream of electric sheep?

**Adrian:** Why not eclectic chickens?

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**Looking at tech from the inside!**

## Serial ATA II

Surrounded in myth, *Atomic* unveils the truth behind SATA II.

**W**hen SATA hit the scene all those years ago it was the next best thing since short shorts and wasabi-flavoured ice cream. Yet even then it was clear that it was just a first step in a new age of storage connectivity.

What we've all been waiting for, of course, is SATA II. At least, that's the message we've all been told.

In truth it's been with us for a while, already integrated into chipsets like NVIDIA's nForce4, but SATA II drives are only just hitting the market now. But what, exactly, are the advantages of SATA II over its predecessor?

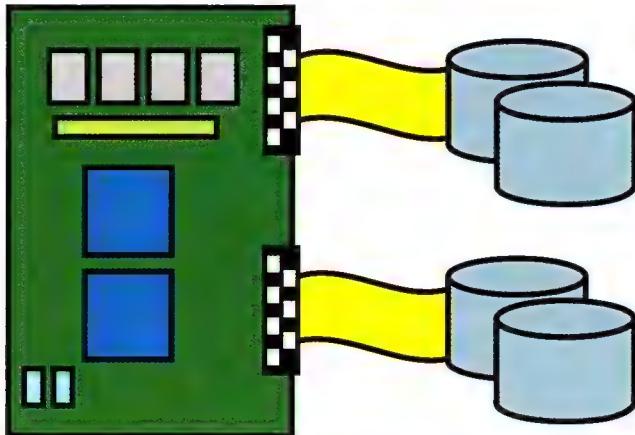
### what it is

SATA is actually the name of the organisation formed to design the specification. It has since renamed itself to the Serial ATA International Organization, or SATA-IO, to avoid confusion.

Truth be known, SATA II is more of a nomenclature upgrade than any major technological shift – the specification does sport a few key advances however. From the desktop and enterprise point of view, the two most important are a doubling of

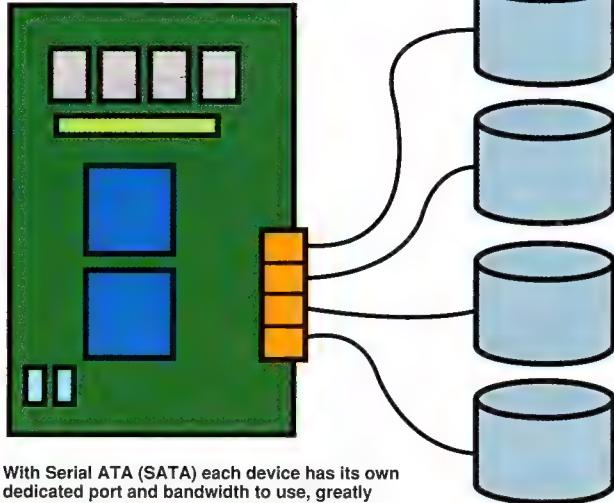
overall bandwidth from 150MB/s to 300MB/s, and the standardisation of NCQ (see X-Ray, Issue 51, page 25) across the board. Also for the enterprise is the addition of Port Multipliers which allow up to 15 disks to be connected to a single port, and Port Selectors which provide support for host failovers – that is, multiple machines can share a connection to a drive, allowing a redundant machine to pick up and access the same drive and data if the primary machine fails.

### PATA – Shared bus



With Parallel ATA (PATA) master and slave drives share the bandwidth on a port, saturating it and causing slowdowns for simultaneous accesses. This is why, traditionally, it was always important to place devices as master on their own IDE port to maximise performance.

### SATA – Point to point



With Serial ATA (SATA) each device has its own dedicated port and bandwidth to use, greatly maximising both efficiency and throughput for each and every connected device.

### SATA inside – or is it?

First, let's clear up the truth about SATA. While the benefits of SATA are clear, all is not what it seems when it comes to SATA drives on the market today. Contrary to first inspection many SATA drives are, in fact, not.

The fact is it costs a lot to develop and produce hard drives, and in an effort to get SATA products to market sooner some of the major hard drive manufacturers delayed the development of native SATA logic boards, instead opting for bridge chips. As a result, many of the 'SATA' drives on the market are actually PATA drives with a PATA to SATA bridge which translates one interface to the other.

### How can you tell?

Initially, only Seagate set out to produce SATA drives with native SATA logic boards from the start, and as a result the entire Seagate SATA lineup are native SATA drives.

By comparison, drives from manufacturers such as Western Digital, Hitachi, Maxtor and Samsung were initially PATA drives with bridge chips. And in fact only recently have these companies started releasing drives with native SATA logic boards. These include Hitachi's 7K250 and new 7K500 line, Samsung's new P120, Maxtor's Diamond Max 10 and MaxLine III drives, and Western Digital's new 16MB cache WD2500KS.



## Does it matter?

In truth, no. The tea is in the tasting, as they say, and while it's logically true that a native SATA interface should provide better performance, in truth it doesn't make much of a difference – at least with respect to the original SATA implementation. SATA II, with some of its more advanced functions like Port Multipliers and Selectors, will require SATA II logic on the hard drive to operate properly, but in terms of standard SATA features – such as increased bandwidth and point to point operation – a PATA to SATA bridge chip on the drive does the job just fine. It's for this reason that popular drives such as the Western Digital 10Kb RPM Raptor SATA drive, using a bridge chip as it does, is still one of the fastest performing drives money can buy despite being out for over a year now.

**In terms of standard SATA features - such as increased bandwidth and point to point operation - a PATA to SATA bridge chip does the job.**

## Does SATA II deliver?

While the feature set of SATA II sounds compelling from a bandwidth standpoint, keep in mind the majority of its features are designed for the enterprise and not the desktop. While some of us take 'enterprise' to often mean faster



An example of what you will find on all but the most recent SATA drives today – looks like a SATA drive with the SATA power and interface connectors, but note the presence of the Marvell bridge chip directly above the power interconnect. This is a PATA drive in SATA clothing.

and expensive, as is the case with SCSI drives, and go off and buy a set to have the ultimate in performance, here enterprise really means enterprise. Features such as Port Multipliers and Selectors, hotplugging, staggered spin up, NCQ and even the increased bandwidth ceiling really don't do anything for the desktop – you need many drives in a RAID configuration to see the benefits of these features. One or two drives in a desktop system, sitting in RAID 0, 1 or combination thereof, will see little benefit from going to native SATA II. Even the promised performance of NCQ is debatable, with

proponents such as Western Digital saying it actually harms desktop performance even while other vendors tout its advantages. Keep an eye out for *Atomic*'s take on the necessity of NCQ in the near future.

The bottom line, then, is not to be concerned. Current generation SATA drives, bridge chip or no, all perform up to expectation. SATA II drives, to properly support the specification, will require SATA II logic onboard and thus will meet the specification. However, the differences are small even for power users and there's no need to rush out and upgrade your SATA drives just yet.



Western Digital's 10,000 RPM Raptor series is one of the fastest SATA drives money can buy – and it's a PATA drive with a SATA bridge chip.

## Comparison of protocols

Protocol	PATA	SATA	SATA-II	SCSI
Interface	Parallel	Serial	Serial	Parallel
Topology	bus	point	point	point
Connection	80-pin	7-pin	7-pin	68-pin
Max drives	4	15	15	16
Max cable length	0.4m	1m	1m	12m
Queueing	None	None	NCQ	TCQ
Top speed	133MB/s	150MB/s	300MB/s	320MB/s



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# hardcore

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Some things that fire through the labs really make you go 'whoa'. Something we haven't yet wiped our greasy hands on, but will as soon as they're available, is a new type of keyboard. I'm pretty sure I pre-emptively detected a roll of the eyes. Sure, many manufacturers have tried and failed to re-jig the keyboard. Well, luckily this time around the Russian creator, Levedev, isn't trying to reinvent the keyboard.

Fresh out of its design phase and now undergoing production negotiations, the Optimus keyboard has a similar layout to most – with a few more thrown in – and uses colour OLEDs for the keys, paving way for some remarkable possibilities. Want to switch to Dvorak or even a Chinese character set? How about a Quake III layout? These

are all possible – and pretty much everything under the sun, as Levedev plans to release an SDK, making it an open source project. Check out the tantalising concept pics at [artlebedev.com/portfolio/optimus](http://artlebedev.com/portfolio/optimus).

As I've mentioned in the past, we've all grown used to the humble keyboard, so instead of trying to replace it, it's good to see people improving it. Imagine in World of Warcraft, for example, where all the cast buttons are now on your keyboard, with the appropriate icon (and possibly even animated). This both saves screen estate and makes using them a whole lot quicker. Perhaps even freaking awesome.

Nathan Jenkins of Shutter  
[nathan@atomicmpc.com.au](mailto:nathan@atomicmpc.com.au)



## this month

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### Tech Trends

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### Ground Zero

Dan Rutter has a tool for every time. And he says you should keep them sharp and ready.



### Gearbox

The best gadgets known to humankind and the four multidimensional multiverses.

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### Framerate

Got the frames? You do now, with Nathan's review of three more sweet saucy cards.

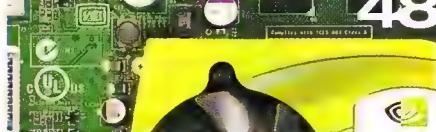
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### Head to Head

Silence is golden, and all that shiz. Quiet your PC with a silent PSU.

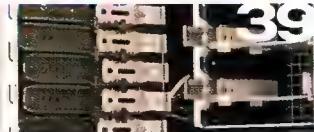
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### Kitlog

It's a log, of kit. The very best, in fact, for all your kitlogging needs.

## hardcore reviews



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## CORRECTION

The Shuttle SD31P review in Issue 55, page 52, incorrectly listed the supplier as Sato Technology. The correct supplier and website is of course Shuttle at [www.shuttle.com](http://www.shuttle.com).

# short circuits

**Many years ago** (six in fact), Microsoft talked about 'MS Venus', an operating system designed for the lounge room that had only the basic processing capabilities required on a television – highly affordable and the like. The only problem was that it was never released. Seeing as there are far more television sets to computers in the homes of China, a company called Shanda has announced an apparently inexpensive new system called the 'Shanda Box' at a Chinese electronics show, with the aim of moving net content to the telly. Unless this system is dumbed-down, it sounds an awful lot like a take on the media centre world.

**The hotly anticipated R520 core** from ATI is almost with us, with the company having dealt with the 90nm manufacturing issues that has held back mass production. We've also learned that ATI's next chip, the R580, is expected in the early months of 2006. With luck, the company will have some competition out for the 7800 sooner rather than later.

**Intel is teaming up with actor Morgan Freeman to offer movies for download from the net before they hit DVD. This could potentially be the new iTunes for movies. However, could this mean there is something on Intel architecture**

that only those running an Intel CPU will be able to view these? It would make sense, because some form of digital copyright protection or a stringent identification system will no doubt be necessary. Otherwise this could possibly add a bigger flame to the rampant online piracy underground.

# techtrends

Quenching your thirst for the latest technology and hardware happenings

Have you ever seen a more manly finger?



## Nailing the files

**Nathan Davis sticks his finger in his drive.**

If Yoshio Hayasaki and his team at the University of Tokushima in Japan get their way, you'll all soon be storing data on parts of your body, or more specifically, on your fingers and thumbnails. Using femtosecond laser pulses (ultra-short laser pulses lasting one quadrillionth of a second), they have discovered a method of storing up to five megabits on the translucent, keratin, human fingernail, depending on the size and shape of the nail.

Of course, this is quite simple in concept, as all that is needed to store data is something to represent 1 and another to represent 0, often via pits and rises. What they've done here is have a laser etch the bits (each with a diameter of 3.1-microns) into the nail and then a fluorescence microscope can easily pick up the data from the resulting increased fluorescence on the etched bits. On top of that, the 5Mb was achieved using an objective lens to create layers – three in fact, with 40, 60 and 80 microns being the set depths.

We pondered over how this idea was conjured up in the first place (*honestly, what the?*), and it all seemed to come down to a common focal point – it was just meant to happen: bytes should be stored on the digits. Oh yes, we went there and we're not coming back.

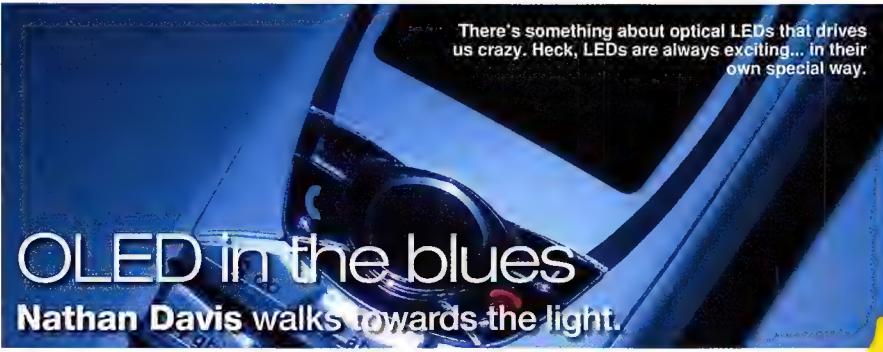
That said, this would make it the first pseudo-one-write-only type of storage medium and definitely the first such digital medium that grows. There's no doubt it is among, if not the most, portable types of storage mediums around. Rumour has it that if grown long enough, several terabytes can be achieved on a single nail, paving way for entire collections of certain data types and wads of innuendo.

As much as this is inventive and attempting to be innovative, it's also rather useless. The ability to carry around data on your actual body is certainly dreamy however there is one major issue that rears itself – when the nail grows out, generally it will either be cut off, bitten off, or just plain fall off from a small knock all thanks to excess length. When this happens, the data will be lost. That is unless the data could be partitioned into sections and 'cut along the dotted line' for storage in the 'filing cabinet'.

We hear this just might spark a total frenzy and competition will arise with slightly more permanent 'teeth' and 'eyeball' storage solutions coming about soon, with higher-density nail storage solutions coming out in retaliation.

They're yet to develop a system to write data to a fingernail that's still attached to its owner.

**...discovered a method of storing up to five megabits on the translucent, keratin, human fingernail...**



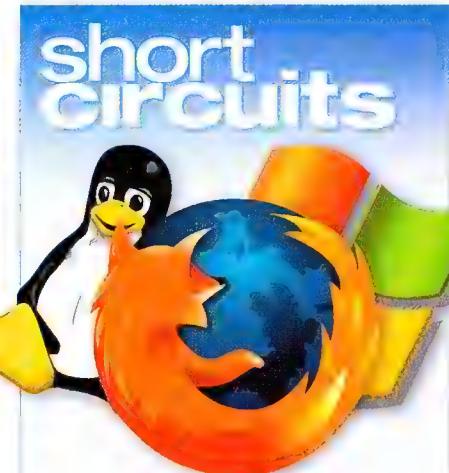
## OLED in the blues

Nathan Davis walks towards the light.

**O**LDS have found their way into many devices of late, particularly in gadgets where portability and limited power are issues, such as MP3 players and mobile phones. They are full of advantages, with the primaries being far lower electrical requirements when compared to LCD and no need for backlighting, resulting in a thinner profile. All this, yet it still offers bright and vivid colour reproduction. Seeing as the backlights on all LCDs account for a large chunk of a display's real-estate, not only is this great for a thinner and a potentially rollable display, but the lighting is perfectly distributed. As such, all the pixels are self-lit, making monitor halos and dark spots a thing of the past. This means a better image can be displayed.

Of course, the powers that be are interested in improving them, particularly in the juice-usage arena. As a result, phosphors are about to find their way into OLED displays, capable of delivering four times better power efficiency, yet still outputting the same amount of light. The problem of late has been the somewhat short 1000-hour lifespan of the blue phosphorescent OLED when set up in this manner – until now.

With longer-lasting red and green OLEDs already in its bag, Universal Display Corp has now smashed this limit for blue with a new technique that allows the blue phosphorescent OLEDs to last up to 15,000 hours. That's a nice dollop of gaming time – just under two years of constant operation.



**Research has apparently** cropped up that shows that there is a 50 percent chance that an unprotected Windows machine will be compromised within 12 minutes of internet connectivity. Having seen this news, we almost jerked a knee and spent a day installing Linux on all of our machines, but found this research conveniently came from a security firm. This research included spam, spyware and viruses, those of which we've not come across since having used a firewall, common sense and Firefox. So basically, use protection.

## Missing lap

**L**aptop security is a bit of a misnomer and an oxymoron at the present moment. Any half-witted thief can steal a lappy and on-sell it to unsuspecting customers. There's just not enough security and unless you have a high-gain remote sensor controlling a pack of explosive thermalite installed within. More often than not they can also get to your precious data.

LoJack, a fairly large automobile security company, is licensing its brand name to Absolute Software who will be selling a new system called 'LoJack for Laptops' that will be based on Absolute's own 'Computrace' software. This is essentially tracking software that, according to

their website '...deters laptop theft and recovers stolen computers guaranteed.' Somewhat of a claim for a measly piece of software, but basically when a stolen system is connected to the internet, it 'silently' sends location data to Absolute Software who then in turn contact authorities. Absolute provides up to a \$1000 payment if the stolen lappy is not recovered within sixty days.

What really gets to us is the issue that it's software. Going back to the half-witted thief, he/she will more than likely wipe the contents of the machine before connecting it to any form of network.

A hardware component is the best solution, but the only way this could really be done at the moment is via the use of a system not unlike an internal mobile phone. This way it's completely separate from the notebook, for relatively stealthy operation and easy triangulation of its location, though it would need some way of being activated remotely. Unless, of course, the thief is not a half-wit and also removes such a security module.

For now, you're going to have to settle with either thermalite or just not getting it stolen, because yet again, this is delusional security at its best.

**After much rumour, IBM has finally** announced its dual-core PowerPC offering. The new processor line, dubbed 970MP, will support chips up to 2.5GHz and pack 1MB of L2. What's even niftier is that the second core can be deactivated when it's not in use, making the chip run cooler and consume less power. The 970MP is expected to make its debut on new PowerMac G5s.

**A new method for wireless** data transmission has been invented and this one steps on a grey area. Dubbed xMax (surprisingly similar to WiMax), it transmits data over existing commercial frequencies. As illegal as this may sound, it essentially 'whispers' over the radio waves, creating an undetectable 'sub-network'. Only with the right equipment can you pick up the weak signals. The great thing about this is that it can operate at the Holy Grail low frequencies, with the ability to continue much farther through obstacles than WiMax.



Thieves who try to break into stolen LoJack laptops will encounter this 'Busted!' message, super-imposed on a Sydney UBD map.

# ground zero

Technology from the front

## Tool time

**Daniel Rutter** wants to sell you a set of steak knives that'll cut anything.

**L**et's go a little low-tech for a moment, like knives and stabbing weapons. Every nerd needs a pocket multi-tool. What if you have no money to speak of to buy one, though? A decent Swiss Army knife is \$70 retail; the nice new Leatherman Charge is \$250.

Well, don't buy some cheap knock-off. They're invariably made out of lousy steel. Much better to visit the local pawn shop and/or auction site, buy a used brand-name knife for close to nothing, and clean, oil and sharpen it yourself.

To de-crusticate a Victorinox, Gerber or Leatherman product that's apparently spent seventeen years in the armpit of a wendigo, you can't go past an ultrasonic cleaner. Basic cleaners big enough for a pair of Dame Edna glasses have been \$100 items at electronics stores for years and let you get serious dirt off intricate assemblies. Without it, you need to use considerable elbow grease, or solvents that'll make the plastic scales on the sides of a Swiss Army knife go all gummy.

On to the oiling. First rule: Put the blue and yellow can down. WD-40 is not one of my favourite things. I have some, of course; everybody should. It's great at displacing water, stopping squeaks in filthy rusty things, loosening bolts and so on. But WD-40's mainly kerosene and it's a lousy lubricant. If you want to clean something smaller than a tractor, oil it, and/or stop it rusting in the future, WD-40 will disappoint you.

Instead, call your local gun shop and enquire about Break-Free CLP ([www.break-free.com](http://www.break-free.com)). The story goes that CLP was created in response to a 1971 US Army 'Purchase Description' for a cleaner, lubricant and preservant that was widely believed to be impossible to make – until someone made it, two years later. Today, a significant proportion of the world's firearms smell of this stuff, and for very good reason.

Gun-nuttery is entirely optional. CLP works just as well on tools of all kinds, computer fan bearings, bicycles, those spring-loaded Klingon daggers; you name it. It's well worth what you pay, which shouldn't be much for a small bottle that'll last most people many years.

**Don't buy  
some cheap  
knock-off.  
They're  
invariably  
made out of  
lousy steel.**

On to sharpening. Making blunt blades sharp is something every geek should be able to do. You don't need to have a propane forge in the back yard and a deep affection for old truck leaf springs to care about this stuff. Even discount-store kitchen knives and \$3 used multi-tools deserve a decent edge; a sharp knife really is safer than a blunt one, unless someone's actually trying to kill you with it.

There are, of course, a million and three gadgets that all claim to make it easy to hold a particular sharpening angle, and some of them even work. The recently developed Columbia River Slide-Sharp ([www.crkt.com/slideshrp.html](http://www.crkt.com/slideshrp.html)) is probably the best of them. Every electric sharpener ever made is equal worst.

It's no big deal to learn freehand sharpening on a few two dollar knives, though. All you need is appropriate abrasives. Today, that means 'diamond cards', which are pieces of steel with an industrial diamond coating.

Unlike some natural stones, diamond cards work fine with only water as a lubricant (or spit, if you want to look macho). You can use oil if you like, but it's messier and won't work significantly better. And to a first approximation, diamond cards never wear out.

You can get very nice diamond cards from various companies that also make knives, plus a few specialists like Eze-Lap ([www.eze-lap.com](http://www.eze-lap.com)). You can get good-enough diamond cards, however, from many of the same discount stores that sell the suspiciously cheap kitchen knives on which you can practice sharpening. Less than ten bucks is the going rate for a set of three differently graded cards. Add another two bucks for an almost straight butcher's steel (which you use to realign the edge on a knife, not sharpen it), and you're done. Off to the auction sites then, boys and girls.

Never underestimate the power of tutleneck sweaters.  
[dan@atomicmpc.com.au](mailto:dan@atomicmpc.com.au)



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Receive a free WD Cool T-Shirt  
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[www.esysdistribution.com](http://www.esysdistribution.com)

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Phone : 1300 100 100  
[www.synnex.com.au](http://www.synnex.com.au)

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Phone : (03) 9541 8888  
[www.westan.com.au](http://www.westan.com.au)

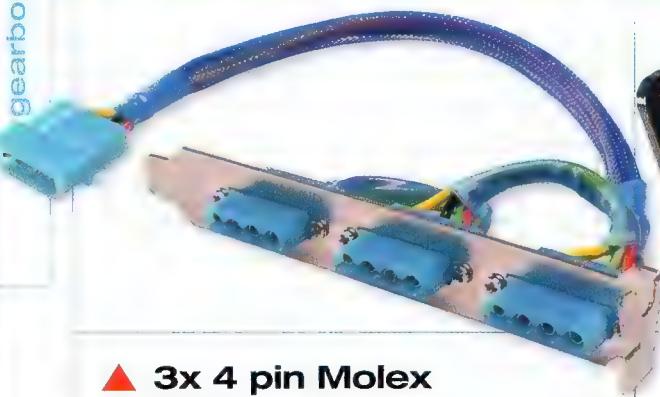
Terms and Conditions : Every Purchase of Western Digital 250GB - 400GB SATA or PATA drive from authorized channels is entitled to receive a free WD Cool T-Shirt.  
Promotion is valid from Aug 1 to Aug 27, 2005 or while stock lasts and is subject to change without prior notice.  
Promotion model : WD2500JB/JD/J/S/KS, WD3000JB/JD, WD3200JB/JD, WD4000 KD

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# gearbox

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gearbox



### ▲ 3x 4 pin Molex PCI Bracket

Supplier PC Case Gear

Website [pccasegear.com.au](http://pccasegear.com.au) Price \$8

Power to the people! And lots of it, we say. In fact, if your machine is packing some 900W beast of a PSU and you feel the need to share that power with the world around you, this nifty PCI bracket will let you do just that. Sporting three external molex connectors you can power just about... well, anything you want! Win!



### ▲ Aerocool Turbine Fan

Supplier CoolPC Website [www.coolpc.com.au](http://www.coolpc.com.au) Price \$27

Twelve centimetres of raw fan power! Best of all, it comes in a range of colours and designs so even the most fashion-conscious of case modders will be pleased. This sucker packs sixteen double-layer fan blades (which Aerocool states is more than any other 12cm fan on the market), a 950rpm speed and pushes 37.44cfm. Fan-tastic, in other words. And, just to make sure it's as customisable as possible, you can detach the fan head. Really, what else could you ask for in a 12cm fan?



### ▲ Sunbeam Chameleon

Supplier XCOM Technology

Website [www.xcom.com.au](http://www.xcom.com.au) Price \$40

Embrace your passion for bright pretty lights with this nifty gadget. Well, it's not really a gadget... more of a 5½-inch drive bay-sized control panel with four complementary light thingies. The box promotes them as 'lasers' but rest assured they're plain-old LEDs. The great thing about the Chameleon is that you can adjust the colours using the panel dials, giving you everything from soft oranges to vivid purples. With this baby, your box will be well prepared for the next Mardi Gras, alien attack or LAN event.



### Scythe Silent Box ▶

Supplier XCOM Technology

Website [www.xcom.com.au](http://www.xcom.com.au) Price \$55

They sure do make these silent drive housings heavy these days. The ones with passive heatsinks anyway. Scythe's Silent Box lets you keep a PC drive quiet, using a combination of noise and vibration-dampening butadiene polymers. Be aware that the Silent Box is designed for hard drives only, lacking a removable or cut-out section for CD or DVD drives. A special strip of metal, fondly called 'Heatlane Technology' by Scythe, keeps the drive cool and supports disks as fast as 10,000rpm.



### Xmod Cable Management Kit ▶

Supplier PC Case Gear Website [www.pccasegear.com.au](http://www.pccasegear.com.au)

Price \$16.50

Seeing as installing high-power wireless antennas inside your PC would just cause a massive explosion of PCB, circuitry and that dangerous thing that comes with any blast, fire, most people have to put up with cables to connect their parts together. Enter the Xmod Cable Management Kit, which lets you clean that damn clutter up with a series of spiral-cut sleeves. As an added bonus, they're UV-reactive, so they should look pleasantly luminescent in just about any case mod.



### Powerguard Extreme Computer ▶

Supplier Power Guard

Website [www.powerguard.com](http://www.powerguard.com)

Price \$299-349 (depending on model)

So you've got, like, ten bagillion dollars worth of precious equipment in your hovel, fragger away at all hours of the day and then WHAMMO! a lightning strike hits your neighborhood and all your precious gear is as totally toasted. How can you prevent this horrible depiction of depravation and death? No problem! Make sure your gear is plugged into a reputable, Australian-made, surge protector like the Powerguard Extreme Computer and you're set. More than this, it'll filter out brown outs and even has a line filter to protect your phone and ADSL modem, too.



### Seagate Portable External Hard Drive ▶

Supplier Seagate

Website [www.seagate.com](http://www.seagate.com) Price Various

Portable hard drives have really taken off. Seriously, they're flying through the sky like high-speed, turbine-powered helicopters with pilots high on LSD. Seagate's contribution to this speed-addled wing of vehicles comes in a variety of flavours, the larger (and most impressive) being 100GB models. That's loads of space for everything from games to hardcore goat pornography. With a hard-metal finish designed to withstand the most arduous of tossing, it really does beat the pants off the competition. Also available in a 40GB model for those with smaller requirements.



### 3-in-1 SATA Combo PCI Bracket ▶

Supplier PC Case Gear

Website [www.pccasegear.com.au](http://www.pccasegear.com.au)

Price \$8

You can buy some pansy-assed USB drive or portable mini hard drive to share your pr0n and other essential files between friends, or you can do file sharing the Real Man's Way – by using full sized hard drives. Afterall, they store waaaaay more. But what about the hassle of unplugging and plugging in a drive from within a case? Enter the 3-in-1 SATA Combo. This simple gadget provides two power junctions and a SATA connector in a PCI bracket to allow you to hook up a normal hard drive, externally. Simplest ideas are always the best.



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# framerate

Our look at the fast, the furious and the pretty



## Sapphire RADEON X850 XT PE

**GPU ATI RADEON X850 XT PE**

Memory size **256MB**

Core clock **540MHz**

Effective memory clock **1180MHz**

Memory type **256-bit GDDR3**

Pixel pipelines **16**

Vertex shaders **6**

Video-in **S-Video; composite**

Video-out **DVI; D-Sub adaptors; component; composite; S-Video**

Price **\$899**

Supplier **Achieva**

Website **www.achieva.com.au**

With the new power-beasts just saturating the market, the X850 XT PE marks one of the fastest previous-generation cards around. This means it'll be one to watch for a nifty price-dip. With a 20MHz faster core and 100MHz faster memory compared to the vanilla X850 XT, it packs an even bigger punch. Sapphire has also popped VIVO onto this baby, really giving it some kick-in-the-pants features. Reasonably quiet with a dual-expansion slot profile, this card will laugh at practically anything thrown its way.

## ASUS Extreme AX800XL

**GPU ATI RADEON X800 XL**

Memory size **256MB**

Core clock **400MHz**

Effective memory clock **990MHz**

Memory type **256-bit GDDR3**

Pixel pipelines **16**

Vertex shaders **6**

Video-in **S-Video; composite**

Video-out **DVI; D-Sub adaptors; component; S-Video**

Price **\$749**

Supplier **ASUS**

Website **www.asus.com.tw**

As we've mentioned in the past, the X800 XL is ATI's answer to the dwindling X800. With all the potential pixel pipelines now switched on, it performs wildly close to the highest-end cards, though allowing for some headroom for a reason that the other cards exist. It is obvious the memory and core frequencies have a significant performance difference, but even so, this card is quite the beast. It also includes Video-In, so for a slightly more media centre-flavoured machine, this would be right at home – albeit with no component.

## Albatron Trinity 6600

**GPU NVIDIA GeForce 6600**

Memory size **128MB**

Core clock **300MHz**

Effective memory clock **1000MHz**

Memory type **128-bit DDR**

Pixel pipelines **8**

Vertex shaders **3**

Video-in **None**

Video-out **DVI; D-Sub; component; composite; S-Video**

Price **\$195**

Supplier **Albatron**

Website **www.albatron.com.tw**

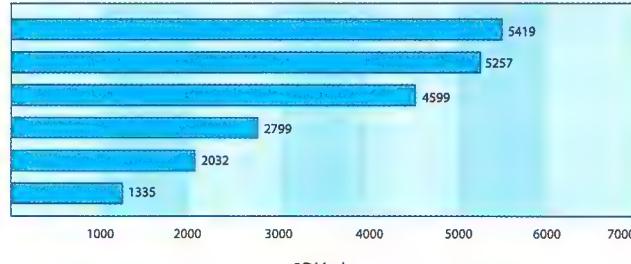
Passively-cooled video cards tend to get excessively heated. So much so that they almost leap out at you and burn a logo into your hand. This demon is no different, except it'd rather make your hand look like a tasty flame-grilled chunk of beef. When in use, the heatsink on this card screams well beyond the 'that's a little bit hot' region. So you end up screaming too. It is completely silent and this level of heat doesn't seem to affect its performance, but some good ventilation is a *must*. It's an otherwise well-performing 6600 card.

FarCry - 1280 x 1024



Average frames per second

3DMark05



Seagate  
5-Year  
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# headtohead

Bite-sized comparative round-ups of the hottest gear

## Silence of the fans

In the quest for a quieter PC, the humble PSU comes under scrutiny. Daniel Rutter checks out some of the best.

**I**t's easy to make a silent power supply.

What you do is get a normal power supply, and you take the fan out of it.

What this gives you, of course, is a PSU that needs something else to blow air through it. Convection isn't enough to keep a normal PC PSU cool, unless it's sitting naked and bare outside the computer.

Basic PCs depend on the single fan in their PSU for all ventilation, but many better-cooled

PCs aren't well suited to fanless PSUs either. If you have an intake fan and an exhaust fan that bypass the PSU location, a PSU that can't cool itself may miss out on air flow altogether.

So if your goal is a quieter PC that uses a quieter PSU, keep in mind that quiet PSUs still need plenty of airflow.

It's for this reason that even some 'silent' PSUs still include a fan, albeit low-powered. These can cool the PSU, but nothing more,

and certainly not enough to keep a whole PC ventilated. That fan is usually thermally controlled, so it spins slowly and makes practically no noise unless the PSU's hot enough that it needs more air.

So for this roundup we looked at a number of PSUs that fit the bill of powerful yet quiet, some with fans and some without, and when installed with good ventilation will bring you one step closer to that silent PC dream.

### How we tested

We were all set to run Sound Pressure Level tests on these PSUs, when it struck us that this was mostly a moot point.

Unless you're making a fanless computer – which is virtually impossible if you want to use mainstream components – the noise level of the PSU has to be balanced with the amount of ventilation it'll require from the rest of the computer. Naturally this varies from case to case (and from day to day) and, given they all do a good job of being 'quiet', that makes SPL tests less important than how well these PSUs actually do at their job.

A good PSU comparison basis is main rail power output – the total combined output of the +3.3V, +5V and +12V rails. Most PSU manufacturers include the output ratings of the 5V standby (+5VSB) and negative rails in the total output rating to make it sound more impressive. They may also add the total *individual* ratings of the main power rails. All of these supplies have the standard 86mm height and 150mm width, but they differ by a great deal in depth. Deeper PSUs may not fit in some cases, so keep this in mind.

**Phwoar! Don't tell us this stack of sexy silent PSUs doesn't turn you on. Or, is that just us?**





## FSP Zen

Price **\$220** Rated output **300W** Aggregate main rail rating **280W** Fans **None**  
 Main connector **24-pin** Drive power connectors **4x Molex, 2x SATA, 1x floppy**  
 Other connectors **1x AUX12V 4-pin**  
 Depth **140mm** Manufacturer [www.fsp-group.com.tw](http://www.fsp-group.com.tw)

When it comes to silent PSUs you can't get any more silent than literally ripping out the fan. This is the FSP Zen to a tee, a standard PSU with no fan for truly quiet operation.

The Zen has a good-looking mesh casing, a decent number of outputs, is ATX 2.0 compliant, and sports a 280W main rail



rating which is more than enough to power your almost quiet PC configuration.

Unfortunately, on the inside, the Zen reveals it really is a regular PSU with the fan removed. It doesn't have huge heat sinks (there isn't room), and if it's installed the usual way up in a tower case, most of its metal mesh will face the top and sides of the enclosure, not the bottom where the air is coming from. As a result, the Zen is better suited to some of the more modern cases that place the PSU in a separate chamber at the bottom of the case. Or you could always mount it upside-down.

Speaking of which the bottom of the Zen casing is solid, so the PSU has to do most of its breathing through smaller grilles on its front and back faces. Making sure you use a good system of fans to generate airflow to cover these areas is essential.

About the only thing to set the Zen apart is a nifty blue light on the on/off switch.

Still, it has its place. Catering to the cheap and cheerful crowd, if you don't plan on overclocking or you're looking for a truly silent PSU for that HTPC setup in the lounge room, the Zen could do quite well – provided you still ensure *some* level of airflow through the case to keep it cool.



## Thermaltake Purepower 680APD

Price **\$259** Rated output **680W** Aggregate main rail rating **Unspecified** Fans **2x 80mm**  
 Main connector **24-pin (20-pin adaptor included)** Drive power connectors **10x Molex, 4x SATA, 2x floppy**  
 Other connectors **1x AUX12V 4-pin (EPS12V 8-pin adaptor included), 2x PCI-E 6-pin graphics card plugs**

Depth: **165mm** Manufacturer [www.thermaltake.com](http://www.thermaltake.com)

Two medium-power 80mm fans cool this shiny flagship of the Purepower range. The front fan – the one that's inside the PC case when the PSU's installed – is thermally controlled, and spools up from less than 2500rpm at 25°C to 3400rpm at 90°C, easily pushing enough air to cool the unit as required.



The back panel fan, however, turns at a roughly constant 2000rpm. That makes this a quiet, but never silent, power supply. At its worst, it's no louder than the average beige business box PSU. About the only time you'll see it getting this loud is under heavy load like gaming, in which case your 5.1-surround sound system will well and truly be drowning out any possible noise from this PSU.

Despite its quiet nature, the 680APD can move enough air to keep a whole normal PC, including moderately-hot CPU and video card, well cooled – as long as there's enough ventilation to let the air in. This makes the 680APD a good compromise between noise and airflow.

The 680APD's got a gigantic 680W rating, but Thermaltake for some reason don't publish aggregate rail ratings for it. This is usually the mark of a dodgy PSU, but the 680APD clearly isn't.

You get a forest of output plugs (the cables have cheerful-coloured mesh wrapping, too), plus a 24-to-20-pin adaptor for the 24-pin main plug, and a 4-to-8-pin adaptor to turn the AUX12V plug into an EPS12V.

All up a solid offering from Thermaltake, and a good choice for balancing power, noise, and airflow.



## SilenX Luxuriae

Price \$295 Rated output **460W** Aggregate main rail rating **Unspecified** Fans **1x removable 60mm**  
**Main connector 20-pin** Drive power connectors **9x Molex, 2x SATA, 3x floppy**  
**Other connectors 1x AUX12V 4-pin, 16-pin AUX (for older server boards)** Depth **140mm casing; 168mm including fan; heatsink protrudes another 29mm out of back panel** Manufacturer [www.silenx.com](http://www.silenx.com)

SilenX promote the Luxuriae as being fanless, but the one we got, well, has a fan on it. Right there, sticking out of the inside-the-case panel of the PSU; a very quiet 0.7W 60mm fan, mounted to the PSU with rubbery shock absorbers that make it quieter still.

The fan runs from a passthrough plug adaptor, so you can easily disconnect it or remove it entirely.

The Luxuriae has *no* external ventilation. There is no back grille. Instead, there's a black anodised aluminium heat sink that protrudes almost 30mm from the back panel. The little fan just stirs some air through the PSU inside the case, and has nothing to do with overall throughput.

This top-of-the-line Luxuriae has a 460W rating, but you only get partial aggregate rail ratings – 3.3 and 5V together are rated at no more than 260W, but there's no spec for all three main outputs together.

With an under-load efficiency specification of 80 percent, the Luxuriae will be trying to get rid of an easy 60W of heat if it's powering a stacked machine.

The heatsink on the back can probably manage about 3°C per watt thermal resistance with the help of convection, so it obviously isn't being asked to dissipate more than about 30 watts. Even then, it'd be 90°C above ambient.

The rest of the heat goes into your case, and has to be exhausted by your normal fans.

The Luxuriae has a knob on the back that lets you goose up the supply rail voltages by

about 2 percent. Back-panel output-tweakers like this are, basically, tinsel. PCs can easily accommodate supply rail variance of much more than 2 percent. If yours can't, you've overdone the overclocking.

The Luxuriae is the perfect example of the false bargain of 'silent' PSUs. Yes, it makes no noise of its own (the little fan's inside the computer case, and functionally inaudible), but you'll need more ventilation, all things being equal, to deal with the extra heat the Luxuriae pushes inside your case.



## Antec Phantom 500

Price \$290 Rated output **500W** Aggregate main rail rating **484W** Fans **1x slimline 80mm**  
**Main connector 24-pin (20-pin adaptor included)** Drive power connectors **5x Molex, 4x SATA, 2x floppy**  
**Other connectors 1x AUX12V 4-pin, 1x EPS12V 8-pin, 1x PCI-E 6-pin** Depth **183mm**  
Manufacturer [www.antec.com](http://www.antec.com)



Now here's a power supply. The whole thing looks like one big black heat sink, and it's not just for show. The plain aluminium sinks inside are coupled to the lid of the Phantom with thermal tape.

Antec call the Phantom 500 a 'hybrid fan' design. The fan only turns on when the PSU is hot.

There's a little switch (annoyingly *not* on the back panel) that lets you set the fan to start up when the PSU reaches 40, 47.5 or 55°C. The fan's thermally controlled on top of this; it's a slimline 80mm unit with a 1.7W rating, and at full power the Phantom's easily as loud as a standard grey-box PSU.

In most computers, though, the fan will never get to full speed. In many computers, it'll never kick in at all.

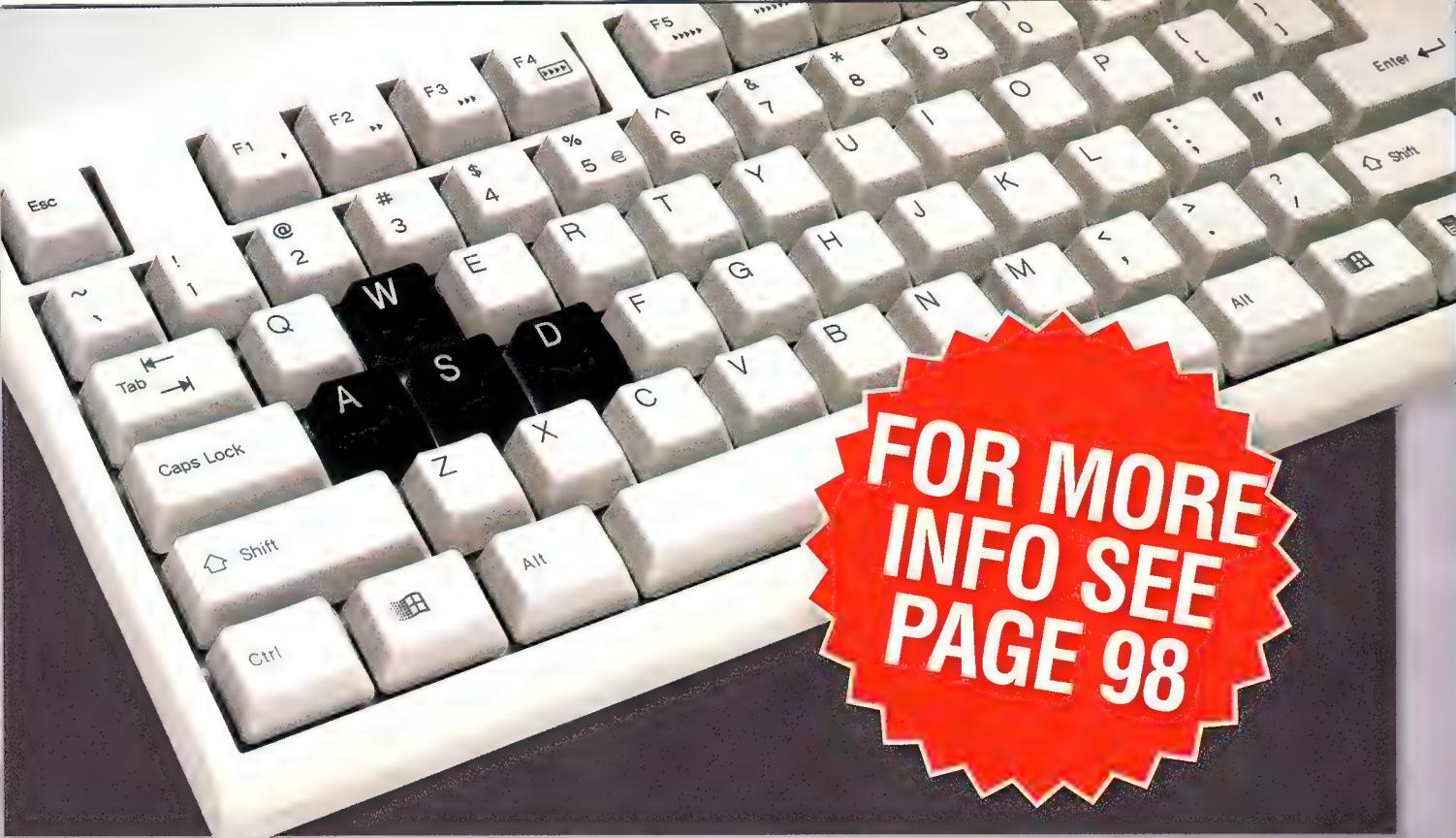
This PSU weighs 3.4 kilograms, which along with its 183mm depth means it'll put serious strain on the PSU mounts of aluminium (or flimsy steel) cases. Antec include a couple of little brackets to help you take the load of your case's back panel – if you can find somewhere to attach the brackets, that is. We recommend judicious application of a few long cable ties.

Provided you can actually install

it, the Phantom 500 provides an excellent compromise between fanless and conventional PSUs. When your computer's idling, the Phantom will probably emit no more than a faint electronic buzz. When you're fraggin' and slaggin', it can take care of itself.

You'll still need separate ventilation fans for airflow, but the Phantom 500 is an overall intelligent and efficient solution at a good price, and gets our pick for this round-up.





**FOR MORE  
INFO SEE  
PAGE 98**

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\*One of six game servers.

# Antec P180

**Ashton Mills takes the silent path with the P180**

Price \$265

Supplier Altech

Website [www.altech.com.au](http://www.altech.com.au)

Specifications 21.3 x 19.9 x 8.1

inch (HWD); steel chassis; 6

internal 3.5" bays; 4 5.25" bays;

3 x 120mm Antec TriCool fans;

optional 120mm and 80mm fans;

double-hinged door; removable air

filters; spare parts compartment.

**B**ack in the glory days when overclocking was a function of motherboard jumpers, when cases only came in beige and had to be hand painted, and pre-made window mods didn't exist, the pursuit of performance came at any cost – and when it came to cooling if we could strap jet engines to our kit to cool the CPU, we would. And for some of us, we did.

Today, years of whining from fans and the obstructed hum of airflow has gotten to us, and now the ideal is to create machines that are as quiet as they are powerful.

Key to this noble pursuit is a case designed with silence in mind. Say hello to Antec's new P180, a stylish box that aims to combine form and function with a number of design elements that are supposed to save your ears.

First and foremost the P180 starts by dividing the case into two 'chambers' – one for the PSU and drives on the bottom, and a main chamber for everything else. This allows heat generated by drives and the PSU to be cooled in their own

'wind tunnel' (when the case is closed) while two exhaust fans in the upper chamber expel heat generated by the CPU and GPU. This should help airflow and allow lower RPM fans to properly cool the system – which means less noise.

Another source of noise is the resonance produced by hard drives and fans connected to the frame of the case. Hard drives are the big culprit here, and it's for this reason that all of the P180's drive bays come with soft rubber grommets (damn, love that word) to absorb vibrations. The PSU and case frame also sport rubber strips to absorb vibrations.

Speaking of which, the P180 includes a special shroud above the PCI-E slots to draw cooler air in from the outside, optionally assisted by an optional 80mm fan. It's a nice idea, but the shroud gets in the way of installation and has to be removed, and is attached directly to the chassis without any dampening – so attaching the optional fan will likely only serve to conduct

vibrations into the case. We elected to remove the shroud and keep it off, relying instead on standard in/out airflow through the case to keep the GPU fed with fresh air.

Finally, while sound proof padding isn't used in the case frame, the side panels do however feature an interesting three layer aluminum and hard plastic design that again goes part way to absorbing resonance and more importantly help mute any sounds inside the case.

We tested with an Athlon 64 3200+ (overclocked to 2.5GHz), Gigabyte 7800 GTX, and 74GB Western Digital Raptors for storage. The Antec TriCool fans



that come pre-installed with the P180 were set to 'low'. There was nary a peep out of the box, with the loudest sound being the fan on the 7800GTX. The Raptors could only just be heard when seeking, but otherwise the box was as quiet a mouse.

Not content to just make a quiet case, Antec has also focused on suave design – the front panel opens and can slide back along the side of the case. The drive bays use plastic rails and clippable (to stop them vibrating) ring pulls to allow easy insertion and removal. And there's even room for an internal toolkit to hold screws.

Overall the Antec P180 is a beautifully styled case that does a good job at reducing ambient and resonant noise. If you're in the market for a new mid tower and rubber grommets are your thing, the P180 stands tall and proud.



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PC Power Play  
Sep.2005, Australia

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- 8\*USB 2.0 , 2 x Firewire (IEEE1394)
- True Power Supply of 220 watts (stable!)



### 7800GTX



- NVIDIA® GeForce™ 7800GTX GPU
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- 256 MB, 256-bit DDR III Memory
- Superscalar 24-pipe GPU Architecture
- PCI Express with Dual DVI / VIVO ports
- Supports CineFX™ 4.0 Intellisample™ 4.0, UltraShadow™ II, PureVideo
- Supports SLI technologies



### 7800GT



- NVIDIA® GeForce™ 7800GTX GPU
- Core Clock 400 MHz; Memory Clock 1000MHz
- 256 MB, 256-bit DDR III Memory
- Superscalar 20-pipe GPU Architecture
- PCI Express with Dual DVI / VIVO ports
- Supports CineFX™ 4.0 Intellisample™ 4.0, UltraShadow™ II, PureVideo
- Supports SLI technologies



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- ABS (optional)
- Chipset supports HyperTransport™ Technology
- Jumper Free Design
- Supports Cool'n'Quiet



### K8NF4X



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- Socket 939 with FSB 1000 MHz
- Supports DDR 400+ Memory Capacity up to 2 GB
- Supports 1\*PCI Express x 16, 3\*PCI Express x 1, 2\*PCI Slots
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Albatron  
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# ASUS A8N-SLI Premium

Price \$320

Supplier ASUS

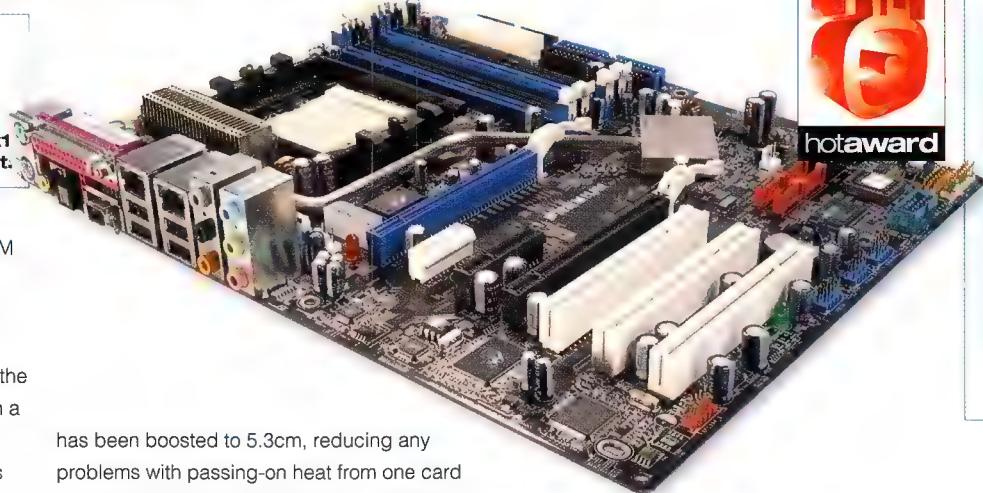
Website [www.asus.com.tw](http://www.asus.com.tw)

**Specifications** NVIDIA nForce4 SLI chip; 4x dual-channel DIMM slots; 8x SATA; 2x PATA; two 16x PCI-E; x1 PCI-E; x4 PCI-E; 3x PCI; dual gigabit.

This nForce4 board was made for the tweaking power user, with a 9-step DIMM voltage control and a vcore modifier with a precision of 0.0125v. These all greatly help in getting that perfect overclock, pushing your CPU as far as possible, pretty much right on the verge of collapse. Which is just damn cool, in a heated sort of way.

Speaking of which, the Northbridge on this board is cooled differently from the norm, with a heatpipe leading from the block on the Northbridge, right up and on to the MOSFETs next to the CPU. Here there is a small passive heatsink, designed to use the air from a CPU cooler to dissipate the heat.

SLI-compatible slots are generally close together, most measuring about 3.1cm of space between the two expansion slots. This is often too cosy, particularly when it comes to installing a 6800 Ultra setup. So instead the space here



has been boosted to 5.3cm, reducing any problems with passing-on heat from one card to another and paving way for better airflow. Overall, this is a more effective design, which allows for that extra bump in speed.

You also no longer need to flip around a PCB card on the board itself to enable SLI or Normal modes. Rather, it's now all done via software, thanks to the beauty of electronics!

It's certainly priced toward the high-end sector, but that's where it belongs. If you want a powerful, solid platform for one rather beastly machine, discounting the AC'97 audio,

with eight SATA channels, four DIMM slots, dual gigabit Ethernet and myriad other features, this motherboard brings the premium beef home. Lovely!

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## Gigabyte 3D Aurora

Price \$199

Supplier Synnex

Website [www.synnex.com.au](http://www.synnex.com.au)

**Specifications** 20.5 x 52.2 x 51cm aluminium case; five 5.25in and seven 3.5in drive bays; three silent 120mm fans with blue LEDs.

The 3D Aurora is Gigabyte's first attempt at a system box. Overall, it has a professional look and feel to it and is surprisingly lightweight for its size, floating in at a mere 6kg.

Cleverly, two holes filled-out with rubber spikes have been popped out at the back to make way for easy water cooling. This is of course only one of many water cooling methods, but the fact this exists saves a potential expansion slot and lowers the leakage risk with less pipe connectors. In terms of cooling, it comes installed with three silent 120mm fans, two of which are exhausts. They're quiet, but exceptionally bright to make up for any lack in noise. At least they don't strobe.

What particularly bothered us was the flimsy side panel, which could do with some sturdyng-up. Aside from that, it was essentially fool-proof and solid as a rock. All installable items are done so via screw-less clips. And

finally, here is a case that doesn't keep the weighty door on plastic hinges and a plastic clip – with two magnets for catching the door and ensuring a firm closure.

For full luminescence, the product name '3D Aurora' is cast at the front-base of the case when turned on.

For the price it's not bad at all for Gigabyte's first entry into the world of cool cases, and we can't wait to see what it brings out next. It doesn't include a power supply by default, so keep this in mind when totalling your costs. Nonetheless, Gigabyte has put a lot of effort into this first generation case and we have to say, they've done a bloody good job of it too.



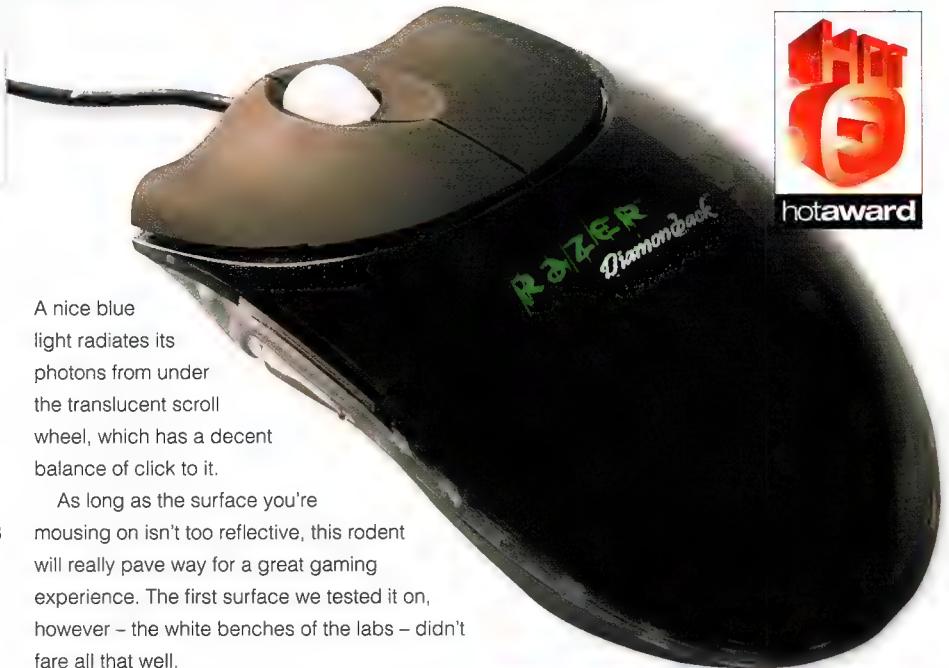
# Razer Diamondback Plasma Limited Edition

**Price** \$99  
**Supplier** PC Case Gear  
**Website** [www.pccasegear.com.au](http://www.pccasegear.com.au)  
**Specifications** USB infrared sensor seven-button mouse; 6400 frames per second; 5.8 megapixels; 16-bit data-pipe; 2.1 metre cord

**W**hat's really different about this mouse is the sensor it uses. Instead of the common LED or the recent laser technology that Logitech introduced, Razer has opted for an infrared sensor. Infrared has a lower frequency compared to visible light, but it is possible this has a laser system running over IR. Whatever the case, one thing is certain – Razer really knows mice.

That said, something far neater this critter introduces, aside from the sweet 1600dpi at 5.8 megapixels, is support for a fatter pipe to your machine, with a 16-bit data path as compared to the usual 8 or 12 bits as seen in most other mice today. This basically means it can reliably transmit up to twice as much data for that perfect headshot.

In terms of design, it's a smidgen heavier than many but with a much lower profile. It also comes with a cute little bag to keep it safe.



A nice blue light radiates its photons from under the translucent scroll wheel, which has a decent balance of click to it.

As long as the surface you're mousing on isn't too reflective, this rodent will really pave way for a great gaming experience. The first surface we tested it on, however – the white benches of the labs – didn't fare all that well.

Though you can't slow down the sensor as with the Logitech MX518, this is one damn good mouse and was built for fast-paced high-precision action. Recommended.

**9.0**  
OUT OF 10

ND

## Pavo XPL-786 Home Theatre System

**Price** \$179  
**Supplier** DCT Pacific  
**Website** [www.dctp.com.au](http://www.dctp.com.au)  
**Specifications** 110W 7.1-channel surround sound speakers; 40W wooden subwoofer, 7x 10W RMS satellites with cloth cover.

**P**avo's speakers look cheap. The seven satellites are very lightweight and cloth-covered – instantly giving away their lack of audio prowess. They're also identical so there's no high-powered centre speaker which others support.

The subwoofer, a cloth-covered and wood-encased contraption, is refreshingly small considering the number of larger units that aren't all that powerful. Everything plugs into a central controller that provides a master volume as well as separate channel volumes.

Turning them up to their loudest is far from deafening but easily fills a small room. They instantly proved they were pretty poor music performers. The treble-rich intro of Bjork's *Play Dead* was reproduced with an obvious lack of mid-range and a total absence of bass.

The thumping intro of *Army of Me* was dealt with surprisingly well by the sub. But that's all. The satellites displayed a severe lack of fidelity and



lyrics were very indistinct. The sub is left to round off the gaping hole in the sound all on its own.

Cranking up the volume sees the sound distort, but without ugly rattles in the casings. It turns what it's playing into a smeared, indistinct, molasses of noise, rather than a fearsome yet crisp racket.

Movie and game playback felt less torturous. One can appreciate the rear channels of the surround sound more without the annoyance of the grim, audio hole. At this price they're cheap

7.1s but there are better 5.1 options. If you're truly desperate for 7.1 audio and don't listen to music, they're good value.

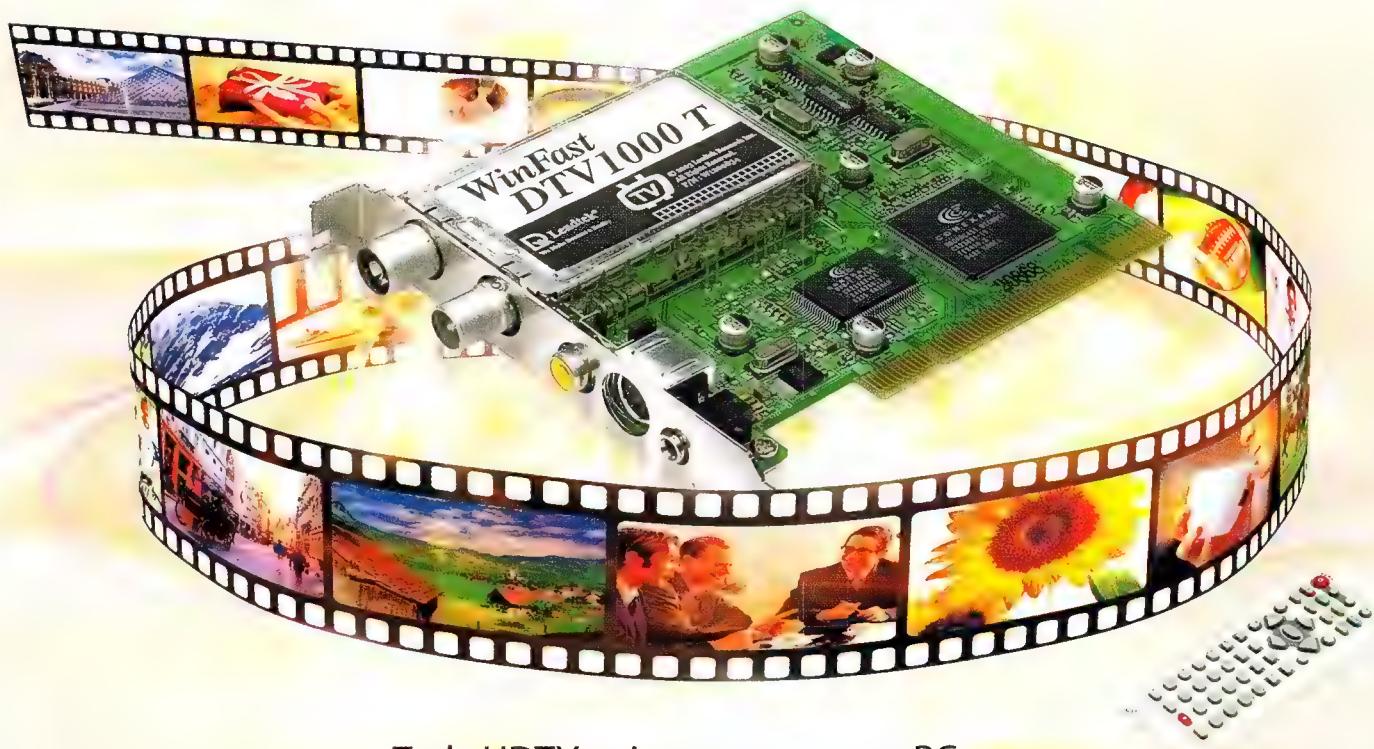
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**5.5**  
OUT OF 10



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**Price \$TBA**  
**Supplier AMI Computers**  
**Website [www.ami-computers.com](http://www.ami-computers.com)**  
**Specifications Two 512MB DDR 1GB dual-channel kit; CAS1.5 at 400MHz; CAS2.5 at 600MHz; platinum copper heatspreader.**

Here is a pair of aggressive DDR400 512MB memory sticks if we ever saw such a thing. With an SPD (Serial Presence Detect) chip reporting the seriously raunchy latencies of 1.5-2-2-5, this would have to mark a milestone. Aside from these beasts Geil has whipped up, all other high performance sticks run at the otherwise fastest attainable CAS latency of 2 when clocked at 400MHz, so the additional headroom should exhibit some nice overclocking.

Considering the enthusiast nature of these sticks, we were surprised to find TSOP modules, rather than the generally more aggressive-friendly BGA modules. TSOP obviously has some juice left up its sleeve.

As they're stupidly fast, the 1.5 CAS setting currently only



works on mobos with BIOS updates to support 1.5 CAS, such as the LanParty range from DFI. You don't need this though to take advantage of high speeds – the fact these babies can run at 1.5 CAS at 400MHz means they have a higher ceiling when running at the standard 2 CAS. Nice and attractive for the low-latency freaks out there.

Arming ourselves with DFI's LanParty NF4 SLI-DR mobo, and flashed with the latest BIOS, we put these puppies to the test.

In dual-channel 128-bit mode, they spat out some incredible results in SiSoft Sandra. When

running at DDR400 with 1.5 CAS latency, they gave a tasty integer stream score of 5980MB/s. Nice, but what about the ceiling? Amazingly, even at 600MHz they could keep to 2.5 CAS, and sported an impressive 6462MB/s integer stream score.

While not the highest overclockers in the history of humankind, they are the fastest tight timing RAM modules we've seen. If you're a speed freak and want the best, Geil ONE should do you proud.

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**Score 9.0 OUT OF 10**

## Shuttle ST20G5

**Price \$615**  
**Supplier Altech**  
**Website [www.altech.com.au](http://www.altech.com.au)**  
**Specifications ATI RADEON XPRESS 200; D-Sub & DVI; 16x PCI-E slot; 32-bit PCI slot; 2x SATA; PATA; Gigabit Ethernet; 8-channel audio.**

This small barebones system is among the smaller we've seen, measuring merely 30 x 20 x 18cm. That said it still manages to pack in two 3.5in hard drives with a 5.25in optical drive sitting on top of those.

Not something we've come across in the past was the ability to underclock the onboard video. If you're simply using it as a basic media box with the onboard video, there's better use in slowing it down so as to have a cooler and quieter running machine. In the BIOS, it allows for the chip to be reduced from the full 350MHz down to 300MHz. Installing memory into it was a pain however, with the PSU hanging closely above the slots.

Of course if you do want a powerhouse, this has all the right bases for it, with a 16x PCI Express slot. This sits next to a standard 32-bit PCI slot, which just might be a godsend to some people, as many of the newer small



barebones systems don't have this. Instead, they pack a 1x or 4x PCI-E slot, which currently are rarely used.

With this slot, you can unlock ATI's new multi-monitor technology and use both the onboard and your own video card at the same time. Given, the card must be of ATI origin, but you can have up to three screens fully operational thanks to its new 'SurroundView'. Which is sweet from an angle.

Silent operation and with the onboard video and high definition 8-channel audio, the ST20G5 is a great foundation for a home media box.

ND

**Score 8.5 OUT OF 10**



**Enjoy the innovation!**

**PF88 Extreme Hybrid**

SIS656+965



- LGA 775 socket for Pentium4 /Pentium D CPU with HT technology
- FSB 1066MHz



- This unique slot is designed to accommodate SIMA card. With EliteBus, users can now enjoy both Intel and AMD technology on one motherboard plus simultaneously experience desktop and mobile CPUs on a single motherboard.

**PF5 Extreme**

Intel 945P+ICH7R



- LGA 775 socket for Pentium4 /Pentium D CPU with HT technology
- FSB 1066MHz

ECS motherboard awards:



**KN1 SLI Lite Extreme**

NVIDIA nForce4 SLI



- Socket 939 for AMD Athlon 64 FX /Athlon 64 CPU with HT technology
- System Bus 2000MT/s



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# Gigabyte 3D Galaxy GH-WIU01

**Price** \$189  
**Supplier** Synnex  
**Website** [www.synnex.com.au](http://www.synnex.com.au)  
**Specifications** Water cooling for Socket 478/775/939; aluminium radiator with 120mm 2600rpm fan; copper cooling block; 400L/hr

**G**igabyte has been breaking into quite a few new markets recently, its latest foray being this little water cooling wonder.

The PVC tubing is much larger than usual, measuring 0.5in in diameter, allowing for increased water flow (though there's a long-standing debate of this versus higher pressure). The copper water block has a multitude of pin-like structures propping up for the water to catch more surface area. Finally, the radiator measures a massive 12.5 x 19.7 x 4.6cm, and is made from aluminium for effective air dissipation and clipped onto a 120mm fan

that's capable of hitting a feisty 2600rpm.

Assembly is a piece of cake, with no leaks and decent instructions. The water block attaches easily, with the only setup requiring



hotaward



any amount of fiddling being Socket 775 systems, essentially converting it to the superior Socket 478 retention mechanism. The quiet 80mm fan on the water block is for keeping the MOSFETs chilly.

In a 22°C ambient temperature, we clipped it onto our beloved Chernobyl, firing her up at the usual 80 watts. On high speed, this champ certainly packs an audible punch, but the temp maxed out at a superbly low 33°C, making it the most effective water cooling setup we've tested to date. On lowest radiator fan speed – with the overall setup now essentially silent – it was just scraping on 39°C, an increase of merely 17°C on the ambient temp.

This is so good it should be unhealthy. Gigabyte has again shown the competition how it's done via total obliteration.

If you're after a high performance cooling solution, whether loud or quiet, this will severely rock your jocks.

ND

**9.5**  
OUT OF 10

## AeroCool GT-1000

**Price** \$75  
**Supplier** CoolPC  
**Website** [www.coolpc.com.au](http://www.coolpc.com.au)  
**Specifications** Socket 478/A/939/775; gold-plated copper core; three halved heatpipes; 36 gold-plated copper fins; 790g weight.

**T**his heatsink/fan kit comes in two primary parts, with the heatsink itself separate to the included 80mm fan. It confused us as to why it was in pieces until after we joined them together and whacked the resulting cooler onto Chernobyl with the Socket 478 retention mechanism. Or at least attempted to.

The retention clip on the side without the fan goes on without a hitch, but the fan was severely blocking the other side. This is a real shame and means you need to pull off the fan whenever installing, upgrading, changing goop or uninstalling. This would have been acceptable had the fan been a simple clip-on fan. Not only does it use four cross-head screws, but their heads are far too easily dug out, making screwing them in or out a mighty difficult task. Luckily that was the only problem we had – all other sockets seem fine.

This HSF has three long heatpipes, each one

halved and led up through the 36 fins on either side. In theory, more heatpipes leading away from the central point of thermal output should drag away more heat up to the point of air-dissipation. For the transference of heat, it is made entirely of copper (including the fins), with gold plating for increased dissipation.

When in operation, this fella is not only very effective at killing the heat, but it's also quite surprisingly quiet. On Chernobyl at the usual 80 watts, in an ambient room temperature of 21°C, the GT-1000 maxed out at 41C. A very impressive result, albeit for a fairly large and weighty heatsink.

It's a little pricey compared to some, but if you're still afraid of water, this cooler will certainly suck out the heat and give you a little more headroom for overclocking goodness. A good air cooling solution.



**8.0**  
OUT OF 10

ND

atomic



# High Tech Should Not Always Mean High Price!

## GIGABYTE SLI-Ready Motherboards



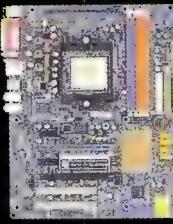
### K8 Triton™ series GA-K8N Pro-SLI NVIDIA nForce4 SLI Chipset

- AMD Athlon™ 64 platform
- NVIDIA SLI Multi-GPU function
- Dual Channel DDR400
- NVIDIA SATA 3.0Gb/s and RAID
- Gigabit Ethernet Solution
- NVIDIA ActiveArmor™ powered Firewall
- IEEE1394b FireWire interface
- 8 Channel Audio



### K8 Triton™ series GA-K8N-SLI NVIDIA nForce4 SLI Chipset

- AMD Athlon™ 64 platform
- NVIDIA SLI Multi-GPU function
- Dual Channel DDR400
- NVIDIA SATA 3.0Gb/s and RAID
- Gigabit Ethernet Solution
- NVIDIA ActiveArmor™ powered Firewall
- 8 Channel Audio



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TECHNOLOGY

Got gear? Use our kitlog matrix to find the best upgrades for your needs.

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you, with our new section for recommended kit! All of these products have been reviewed in *Atomic*. To make it easy we've created a matrix

of categories for you to cross reference, so if you're buying for yourself (*Extreme*) or your mum (*Budget*), you know where to spend your cash.

## CPUs

**AMD Athlon 3200+**

RRP \$290

It's been around for some time, yet still remains one of the top performers for the money. Well worth a 'budget' look.

## Coolers

**Scythe Samurai CPU Cooler**

RRP \$49.50

This cooler sucks – which is a good thing, because it does it so well it keeps your CPU cool.

## Motherboards

**Gigabyte GA-K8T890-9**

RRP \$139

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**Sparkle GeForce 6600GT 256MB**

RRP \$396

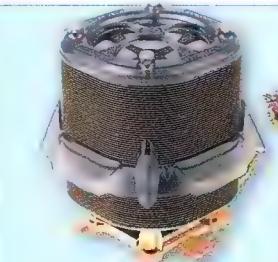
If you're gaming on a shoestring then Sparkle is for you.

## PERFORMANCE

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Cheaper than a gold bar, it remains at the top of the performance podium for features and speed.

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If stability and performance are important, the A8N-SLI Premium is simply one of the best boards moolah can buy.

**HIS RADEON X850 XT**

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This 5ms 17in LCD is cheap and speedy, and plenty good for even the most fussy of grandmas. Send her your love today!

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MX5021**

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**Lian Li  
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The PC-V1000 is a classy and cool case with an excellent design. Fit for a gamer who's after decent design at an affordable price.

**Hitachi  
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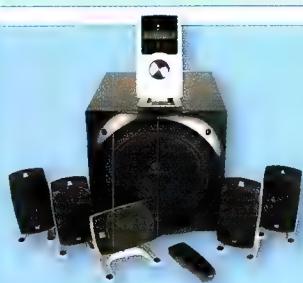
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At \$1.60/GB, this 500GB drive isn't cheap, but it's faster and bigger than anything else on the market.

**BenQ  
FP231W**

RRP \$2799

If you want big, you can't go past 23 inches of big. And wide-screen LCD big at that. Permission to spooge pants granted, soldier.

**Logitech Z-  
5500 Digital**

RRP \$749

Able to play the 'liquid gold' sound that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

**Nextherm  
ICS 8200**

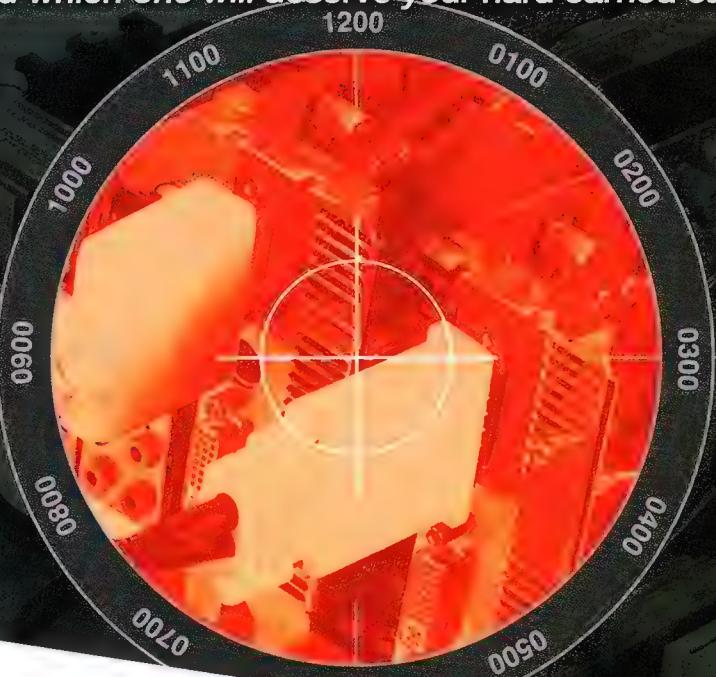
RRP \$470

Packing a peltier with an LCD temperature readout, you can't go past a case this cool (literally) and not want to kiss it all over. Yum!



# CAUGHT in the CROSSFIRE

The two giants of the graphics market are set to go toe to toe with their dual-GPU implementations. **James Wang** pulls them both apart and explains how each technology works, and which one will deserve your hard earned cash.



# ...adding pipelines to graphics processors has been the basis of performance growth in 3D graphics for quite some time...

caught in the crossfire

**C**omputer graphics are what is more commonly known as an *embarrassingly parallel* problem. This is a label given to problems which can be simply split into parts and solved independently without much fuss. Such problems are easily solved by throwing more resources at them. Indeed, adding more pipelines to the graphics processors has been the basis of performance growth in 3D graphics for some time. But what happens when you can't squeeze more pipelines into the chip, when the limits of physics dictate your limits have been reached? Why, throw more chips at it of course!

## The Golden Era

The desire to have more than one GPU per system goes back into ancient times. During the antiquity of PC 3D acceleration (circa 1997), gamers were mainly playing at a resolution of 640 x 480. Higher resolutions were out of the question not simply because they would be too slow, but because there wasn't enough memory on the graphics cards to store the framebuffer. When 3dfx released the 8MB Voodoo 2, 800 x 600 became the new rave. But for some, this still wasn't enough. Luckily, the Voodoo 2 had just the right feature for them. And with it, an age was born.

*Scan-line Interleave* (SLI) was a technology invented by 3dfx and Quantum3D to allow multiple Voodoo cards to work in parallel. The first Voodoo used SLI to make inroads into the arcade and simulation market. The Voodoo 2 saw the first use of multi-board graphics for PCs.

Two Voodoo 2 boards could be linked together via a cable. Both cards worked on the identical frame but each only did half the regular work; the first card would render the odd scanlines while the second card renders the even ones. The final output is produced by merging the two frames. Since each card only needed to store half the scanlines, it saved half of the framebuffer memory. Two Voodoo 2 boards in SLI could therefore render frames in excess of 1024 x 768. Gamers rejoiced. Although each board cost US\$300 at the time and a separate 2D graphics card was needed to provide 2D output, many gamers forked over the cash to buy three graphics cards. They were blessed with 3D gaming at 1024 x 768 – not just a true luxury for the time, but also a sign of the future. Never again would we settle for anything less.

## The Dark Ages

The arrival of AGP pushed multi-board graphics into obscurity. With only one AGP slot per motherboard and PCI graphics cards a dying breed, multi-board systems disappeared.

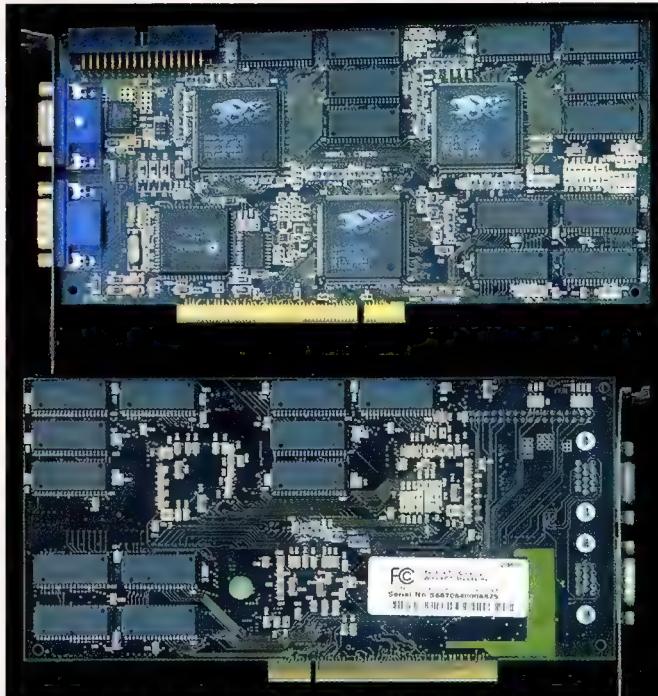
Two ill-fated products did try to break out of the mould. The first was ATI's Rage Fury MAXX which used two Rage Pro chips on a single board. This was launched in late 1999 and was handsomely beaten by the GeForce 256. 3dfx made one last attempt with SLI on what turned out to be their last graphics card, the Voodoo 5 5500. Released in mid 2000 and powered by two VSA-100 chips, it fared no better against the competition. NVIDIA's new GeForce 2 series consistently outpaced the Voodoo 5 and went on to become one of the most successful GPUs ever. After all, who hasn't fond memories of their GTS or MX? From these two examples one couldn't be blamed for dismissing multi-GPU graphics as a one hit wonder of the Voodoo era, and relegated to 3D history.

In retrospect, this turned out to be wrong.

The main reason why the Rage Fury MAXX and Voodoo 5 failed is because the chips that they employed were underpowered. Both the Rage Pro and the VSA-100 were produced on relatively old fabrication processes. This gave them a clock disadvantage against NVIDIA's offering. The MAXX and Voodoo 5 also lacked transform and lighting, which hindered their geometry performance. The last nail in the coffin was their choice of memory, modestly clocked SDRAM compared to fast DDR memory on the GeForce line-up. In essence, these two cards failed not because the dual-chip concept wasn't good but rather their chips and memory were too slow. After all, if a single VSA-100 chip isn't as powerful as half a GeForce 2, how can two of them expect to beat the whole thing? The lesson was this: build the fastest single GPU, then think about linking them together. Which is exactly what NVIDIA did.

## The Renaissance

Since the introduction of PCI Express, the dream of multi-board graphics has once again been realised. As motherboards carry multiple PCI Express slots, the physical obstacle is now removed. PCI-E also provides an unprecedented amount of bandwidth not only to the GPU, but from



Gaze upon 3dfx's Voodoo SLI magic – the cards responsible for launching an entire industry, and the reason you can play 3D games in all their glory today.

the GPU as well. While AGP 8x provides 2.1GB/s of total bandwidth, the sixteen lane PCI-E slots used for graphics boast 4GB/s of upstream and 4GB/s downstream bandwidth. If more than one GPU had to share this bandwidth, you can be sure it won't be choking anytime soon.

And thus, in 2004, SLI was reborn. Leveraging PCI Express and their nForce4 chipset, NVIDIA launched the GeForce 6 series of GPUs with SLI support. This time SLI had a different meaning – *Scalable Link Interface* as it was known was a digital connector that provided a direct link between two graphics boards. But the principle of dividing and conquering the workload remained the same.

Although ATI enjoyed a slight lead against a single GeForce 6800, the X850, irrespective of how many suffixes added to its name, could not fend off two 6800 Ultras working side by side.

And thus CrossFire, ATI's multi-GPU solution, was announced in May of this year. By the time you read this, it should almost be available.

Before we dive into the technology of SLI and CrossFire, it's important to first understand the problems they face. Although graphics is inherently parallel, getting two GPUs to accelerate a single game with total transparency is still no easy feat. There's the traditional problem of

sharing memory and synchronisation. On top of that, load balancing and scene partitioning becomes critical factors to performance. Image quality and FSAA also become more interesting with dual-GPU solutions.

So first we'll first look at the science behind multi-GPU graphics, and then the implementations offered by ATI and NVIDIA.

## Multi-GPU mojo

In an ideal world, when you plug in the second graphics card, games run twice as fast. For this to happen, a few conditions must be met. First, there should always be work for both GPUs to do. Second, the work should be easily split into independent parts. Third, both GPUs should be doing the same amount of work, such that one is never waiting for the other.

The problem of feeding both GPUs constantly is mainly in the hands of AMD and Intel. Unfortunately, it is also the biggest problem facing dual-GPU systems today; no Athlon or Pentium can adequately feed even a single Geforce 7800. Simply put, the CPU takes longer to execute the game code than the GPU to render the graphics. But by no means is this a new phenomenon – it's been around since the Voodoo era. We can only hope that multi-core CPUs and multi-threaded game engines will alleviate this imbalance somewhat.

The problems of splitting up (partitioning) and balancing the workload is the real science of multi-GPU graphics. There are two ways of partitioning the work: split the workload into different frames, known as alternate frame rendering (AFR) or split the individual frame into different parts, which NVIDIA calls split frame rendering (SFR).

## Alternate Frame Rendering

Alternate frame rendering is the most straightforward method of partitioning. Using this method, two frames are calculated concurrently. The CPU begins by feeding the first GPU with an entire frame. While it works on this frame, the CPU hands over the next frame to the other GPU. In this way, both GPUs are working on alternating frames and partitioning is done without fuss. Since each GPU works on independent frames, both vertex and pixel processing power is doubled.

Alternate frame rendering is elegant in that it does both partitioning and balancing. Successive frames are roughly the same and it can be expected that both GPUs will take the same time to render their frame, hence balancing is done automatically.

Alternate frame rendering does have a few drawbacks however. First, its performance is greatly affected by inter-frame effects. Shaders which use the results of previous frames to render the current frame will require the GPUs to pass rendered results to each other. Motion blur, which accumulates results from multiple frames is one such example. Second,

Feature	SLI	CrossFire
Supported GPUs	GeForce 6, GeForce 7 series	X800 series
Graphics board matching	Two identical boards	Any X800 series board with a CrossFire board
Alternate Frame Rendering	Yes	Yes
Split Frame Rendering	Horizontal, on the fly balancing	Horizontal and vertical, static balancing
Tile partitioning	No	32 x 32 pixel tiles
Board to board connection	SLI connector	DVI
Highest anti-aliasing level	16x combined super and multisampling	12x combined super and multisampling



caught in the crossfire

AFR introduces an extra frame of latency into the pipeline. Since the CPU is always buffering two frames, what you see on the screen will always be behind your input by the time it normally takes plus the time to draw an additional frame. At 60 frames per second, this adds an additional 16 milliseconds of latency. And lastly, there are some pathological cases where the game code doesn't work with AFR.

For such cases, split frame rendering must be called into service.

## Split Frame Rendering

Split frame rendering partitions the workload by splitting a single frame into two or more parts. The workload that we keep mentioning is essentially a bunch of unconnected vertecis handed over from the CPU. Normally, a single GPU would take all of the vertices, perform a set of transformations, stitch them into polygons, apply textures and render them into a pretty picture. With more than one GPU, it would be logical to divide the soup of vertecis in half. However, this wouldn't work; since it is not yet known how the vertecis are related, you could end up sending one vertex of a triangle to one GPU and the other two to another. It therefore is necessary for both GPUs to perform the geometry

**With more than one GPU, it would be logical to divide the soup of vertecis in half.**

transformation before partitioning can be done.

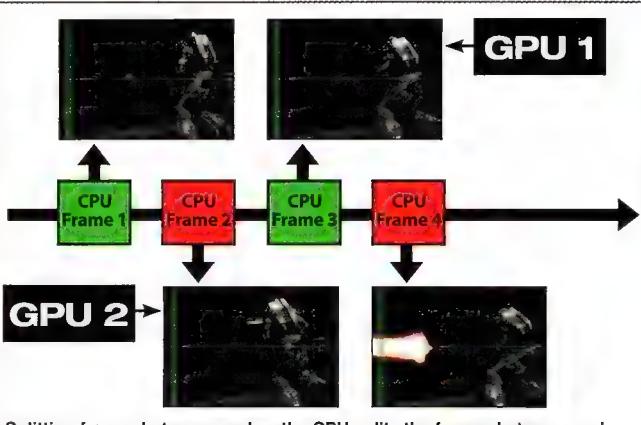
Using split frame rendering, both GPUs process all the vertecis of a given frame until they have been constructed into polygons. Since all this is done in the vertex shader, there will be no performance gains for vertex shading when using SFR.

Once all the polygons are generated, they carry with them the coordinates with respect to the screen. It then becomes possible to split the scene up any way you like. The Voodoo 2 split the workload into alternating scanlines. NVIDIA's SFR splits the screen horizontally. ATI can break the frame into tiles. Beyond desperate differentiation, there are actually good reasons behind each implementation; they are all trying to achieve the best workload balance.

Unlike alternate frame rendering, where each GPU works on more or less an equal portion of the work, when splitting a single frame, there's no telling which part of the frame is more complex than another. For example, indoor first person shooters have a fairly simple stretch of concrete as the bottom part of the screen. The top half of the screen may consist of architecture with complex arches, stairs and lights. In such a case, you'd want the screen to be split with less area devoted to the top half to compensate for its extra

## Performance scaling of different SLI modes

Feature	Single generic GPU	Dual GPU using AFR	Dual GPU using SFR	Dual GPU using tiling
Vertex Shaders	6	12	6	6
Pixel Shaders	16	32	32	32
Total GPU memory bandwidth	30GB/s	60GB/s	60GB/s	60GB/s
Bandwidth to system memory	8GB/s	8GB/s	8GB/s	8GB/s
Effective Video memory	256MB	256MB	256MB	> 256MB



Splitting frames between cards – the CPU splits the frames between each card for rendering, after which they're processed by the SLI mode in use.

complexity. But things also change from frame to frame; if you decide to pull out a six cylinder rocket launcher that takes up a third of the bottom portion, the balance tips. And if you were to take it outdoors, which has a simple skybox as the top half, the bottom of the screen suddenly becomes the more complicated half. So ideally, balancing is done on a per frame basis depending on the content of the frame.

If splitting the frame directly in half results in trickly load balancing issues, are there better ways to do the splitting? Chopping the frame into lines or tiles are two solutions. The first one was adopted by 3dfx in its Voodoo series. If one chip rendered the odd lines while the other rendered the even lines, both will span the top to bottom of the frame and the load will roughly be identical. According to NVIDIA, for a variety of reasons (texture cache locality being a major one), it no longer makes sense to do things this way.

The other method is to divide the frame into tiles. If the tiles are sufficiently small and each GPU renders the alternate tile, load balancing is also achieved automatically. And if the tiles are not too small, they can also preserve some cache locality when accessing textures. There's also



Load balancing in action with NVIDIA's SLI. The horizontal green line depicts the percentage of the image being rendered by each card.

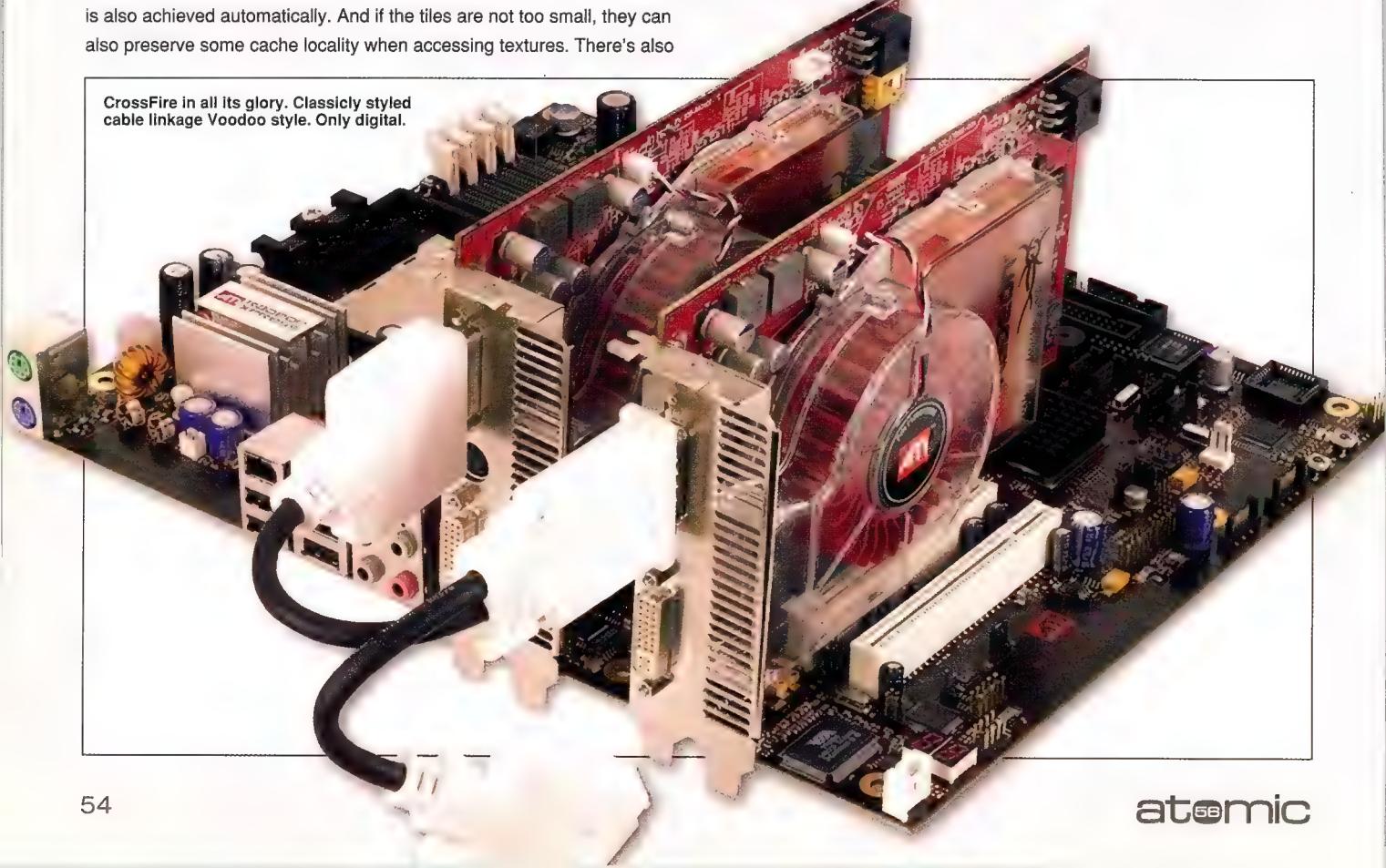
the benefit of some memory savings; since each card only needs to store half the tiles, the frame buffer requirement is halved.

## SLI vs. CrossFire

Now that we've dealt with the theory, it's much easier to understand what ATI and NVIDIA have brought to the table. Despite all the fanfare on each side, NVIDIA's SLI and ATI's CrossFire have a lot in common.

Both Crossfire and SLI support alternate frame rendering. This is no surprise as it's the simplest method to implement. Since it scales both vertex and pixel shading, you can expect most games to be using AFR.

CrossFire and SLI also both support split frame rendering. NVIDIA currently only supports horizontal split frame rendering. ATI supports both horizontal and vertical splits. Since load balancing is a critical issue for SFR, NVIDIA has implemented an on the fly algorithm to determine where to split the frame. As this is done after each frame, it will adapt itself to the game environment.



ATI's split frame rendering uses a predetermined value to split the screen. The optimal split location is determined by ATI after they've profiled the game. They believe this is more effective since there's no CPU overhead associated with calculating the load after each frame.

This method, however, is not the preferred way. ATI has long perfected the tile based splitting strategy for use in massive visualisation systems.

The Evans & Sutherland 'RenderBeast' for example can employ up to 32 RADEON GPUs in a single system by exploiting tile based partitioning. Since this technology has been built into ATI GPUs since the RADEON 8500, it became a simple matter of activating it for CrossFire. ATI calls it 'SuperTile' and it's used as the default mode in DirectX.

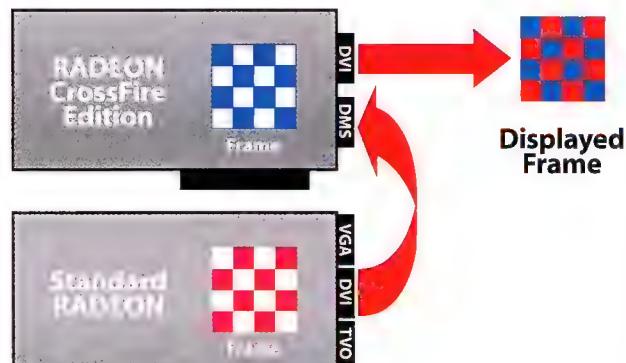
## Anti-aliasing perks

Every time a GPU is made more powerful, higher quality anti-aliasing (AA) modes become available. So with multi-GPUs, it was only natural that new AA modes were unlocked.

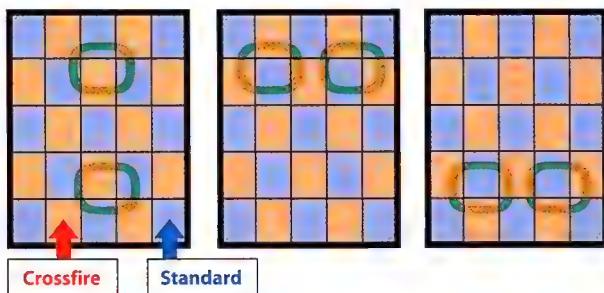
ATI re-ignited the new AA race by trumpeting 12x AA for CrossFire enabled systems. NVIDIA was quick to respond by upping theirs to 16x. We'll have to wait for our CrossFire setup to arrive in Atomic Labs before passing judgement on the better solution, naturally.

## What this means for us

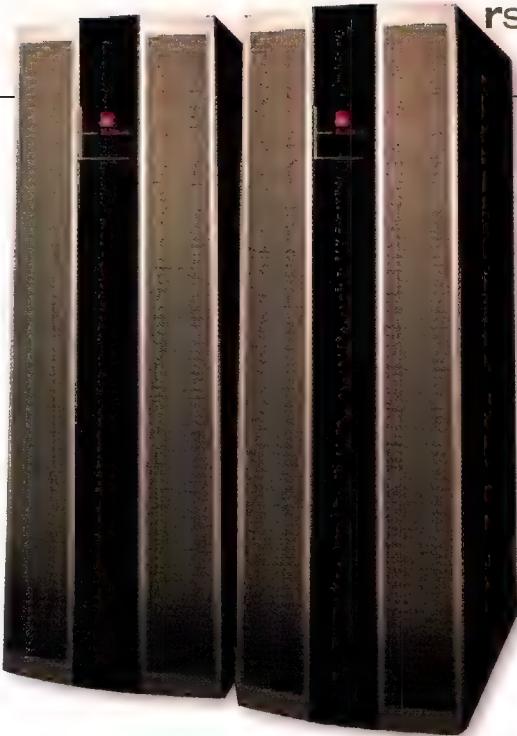
At the end of the day, what SLI and Crossfire provides for PC enthusiasts is an extra knob of control in the upgrade path. Is it worthwhile? Definitely. The longer we can use an existing motherboard to support newer CPUs and GPUs, the less we have to spend on buying new chipsets, which translates to greater bang for your buck. The last thing we want is to keep buying motherboards, which actually does nothing in itself but support



ATI's tiling technology renders alternate tiles on each GPU, combining them into a final solid image.



Textures and tiling with CrossFire – textures crossing tiles need to be loaded into the memory of each card for rendering.



The Evans & Sutherland 'RenderBeast', 32 RADEON GPUs in action. It's supercomputing for graphics! Uhoh.. new pants time again. Hot damn, this keeps on happening... mumble grumble...

the hardware that does the real work. With SLI, a platform's lifetime is extended by roughly one generation.

At the time of writing, no CrossFire platforms have been released for testing, so we can't bring you benchmarks just yet.

Assuming ATI does a reasonable job and performance scaling is in line with SLI, we can expect a performance boost of around 70 percent at GPU bound resolutions. Having given ATI the benefit of the doubt, which of the two multi-GPU platforms is more compelling?

NVIDIA has the benefit of experience. When SLI was first launched, drivers and support were hardly stellar. Only games with driver profiles worked and gamers were forced to hack an XML file to get their unprofiled games working. Things have since improved, with NVIDIA allowing users to create their own profiles. Better drivers have also been released.

ATI will be allowing user profiles from the start with CrossFire. They will also allow mix and match between different vendors' cards (NVIDIA will also be allowing this eventually) to allow more flexibility.

Indeed flexibility was the big theme when ATI announced CrossFire at Computex 2005 – you can match cards with different numbers of pipelines, clock speeds and memory configurations, leading to greater upgrade options for the end user. With NVIDIA's SLI, you're stuck with buying an identical card.

The 'flexibility', however, is not what it seems. With CrossFire, when you match two cards with a different number of pipelines, the system throttles down to the minimum of the two. So if you couple a 12 pipe card with a 16 pipe one, the latter throttles back to 12 pipes to match the slower card. The same thing happens with memory. Matching a 128MB card with a 256MB card will result in the second card disabling half of its memory; you end up with two 128MB cards instead. Clock speed is the only variable that doesn't get throttled down. But it's not clear if ATI's load balancing can exploit the difference. If both GPUs still render the same number of tiles, then the slower card will once again be holding back the system.

Given that perfectly matched multi-GPU setups struggle to provide a 70 percent performance gain, it's hard see why one would purchase a specialised motherboard and CrossFire card only to use it with a slower

## Design architecture

### SLI

The physical implementation of CrossFire and SLI are a little different. NVIDIA has actually been hiding their SLI secret since the GeForce 3 – the technology has been built into every GPU from the Ti series to the FX. They were literally waiting for PCI Express to come along so they could unleash SLI on the competition.

SLI requires two identical GeForce cards to be plugged in an SLI supported motherboard. So far, NVIDIA's nForce 4 is the only platform. The two GPUs are linked together via the special SLI connector which sits on top of the two cards. This link provides about 1GB/s of bandwidth and allows sharing of data without going through PCI Express. According to NVIDIA, the SLI connector handles roughly a third of the traffic between the two cards. Once the second GPU has finished rendering its frame, it is passed to the first GPU where it's output or in the case of SFR, reassembled then output.



card that would drag down the faster one. So while CrossFire does support the matching of different cards, it's really an option few would take; there's simply no point in purchasing a CrossFire platform which is meant to symbolise cutting edge performance only to receive a modest performance boost.

A balanced CrossFire platform should compete well against NVIDIA's SLI. NVIDIA has on the fly split frame balancing while ATI has a well thought out tile based solution; NVIDIA has the advantage of a dedicated SLI connector, but ATI has come up with a clever way of reusing the DVI port. Both have new anti-aliasing modes which should prove useful for CPU limited games. NVIDIA has the neater overall package, but ATI has done well with what's available.

### Beyond SLI

Those with a good memory will remember that 3dfx planned to release a board with four VSA-100 chips, the Voodoo 5 6000. Could quad-GPU systems be the next step? Not just yet – it won't happen in the immediate future for a number of reasons. First, the cost of making a motherboard to support such a setup is prohibitive. Second, the power required would be stupendous; 3dfx was going to incorporate an external power supply for the Voodoo 5 6000. Today's GPUs would only suck up more power. Third, no CPU in the world could hope to feed such a monster; a quad-

### CrossFire

ATI's implementation is little different. ATI requires two different boards for CrossFire. The 'master board' is the new CrossFire board which uses for example a standard X800 series GPU along with an additional chip to help with image compositing. It also requires a 'slave board' which can be any current X800 series board.

The CrossFire board has a new connector at the back which allows it to read DVI input. This is where the slave board comes in. Since ATI was late to the game but also wanted to allow existing users to benefit from CrossFire, their solution had to leverage whatever infrastructure was available on the current X800 series of cards. Other than using PCI Express, the only other digital connection to an X800 is through the DVI port. So CrossFire relies on two different boards, a master board which can read DVI input and a slave board which outputs its result to DVI.

By leveraging DVI, CrossFire gets an alternate channel, but flexibility is also limited. Because DVI is used for outputting the framebuffer, inter-GPU communication is limited to that of the final image. For data sharing during intermediate rendering, PCI Express must be used. Once the frame is passed to the master board, it needs to be either reassembled (for SFR) or passed to output (AFR). While NVIDIA has this logic on the GPU, ATI decided to do it separately. The 'compositing engine' as it's called is implemented on a Xilinx Spartan FPGA. An FPGA (Field Programmable Gate Array) is just like a regular silicon chip except its hardware can be changed even after manufacturing – literally rewritten and reprogrammed on the fly. Used regularly in complex routers and for specialised image processing, it's a cheap and fast way to stitch together framebuffers, which is the case for CrossFire. When using split frame or tile based partitioning, the compositing engine takes the output of the master GPU directly and the slave GPUs through DVI and merges them together.

GPU system would be perpetually CPU bound.

Another option (one that Intel suggested) is to have ATI and NVIDIA form a common standard over multi-GPU graphics. This, alas, is a fantasy. Given how much the two companies love each other, and how much they've invested into their respective multi-GPU hardware, it's inconceivable that this would happen. Expect the SLI wars to get only more bitter as things heat up.

### Conclusion

The real question that hangs over the appeal of CrossFire right now is not NVIDIA's SLI, but rather ATI's next generation GPU, the R520. When NVIDIA released the GeForce 7800 GTX, it triumphed over two 6800 Ultras in SLI all on its own. At the current rate, CrossFire will be released only two to three months before the R520. With so little time between the launches and performance expectations for the R520 going through the roof, CrossFire seems ill-timed for release. Crossfire enabled R520s seem more like the real deal.

All considered, NVIDIA's SLI platform appears to be the better solution at this time; two generations of GPUs are supported, drivers have matured greatly and when powered by the 7800, performance is unbeatable. But all this could change in a few months time. We'll have to wait for – and benchmark – CrossFire and the R520 before passing the final judgement.

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# hotbox OF THE year

**T**oday is the day to end all days. Or should that be months? Regardless, it's Hotbox of the Year time again. This means that today, or this month—whatever works for you—is the most exciting month on the calendar, coming second only to December because it has so many lovely holidays in it.

Previously in Hotbox of the Year, we showcased every single Hotbox that found its way into the competition. This year, however, we're doing things a little different—Hotbox of the Year is dedicated to crowning the best of the best, judging and awarding the prestigious accolade from the Hotbox of the Month winners

over the last 12 months. Thus, here and now on these pages, you can see last year's Hotbox of the Month winners, all duking it out for the grand title. They're swanky, they're mean, and they're modded. But who decides who wins?

You do!

A super stupendously delicious grand prize is on offer for the winning box (see the last page), and whoever wins this fantastic prize is entirely up to you. And right now, they're just waiting to be judged. So, head over to [www.atomicmpc.com.au/hotboxy.asp](http://www.atomicmpc.com.au/hotboxy.asp) and get your voting on. Hurry though, the voting ends on 14/9/2005. Go, go, go!



Make yourself heard and vote for your favourite Hotbox online, each and every month!

**Alex's College Beast**  
Issue No. 44

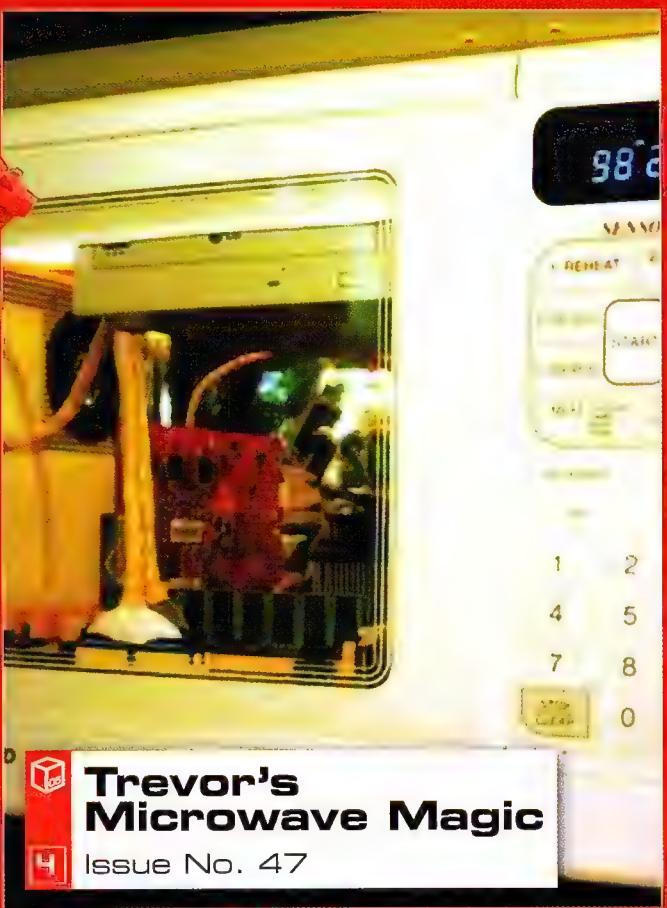
**Amish Penguin Server**  
Issue No. 45



### RabidFrog's Jerry Can



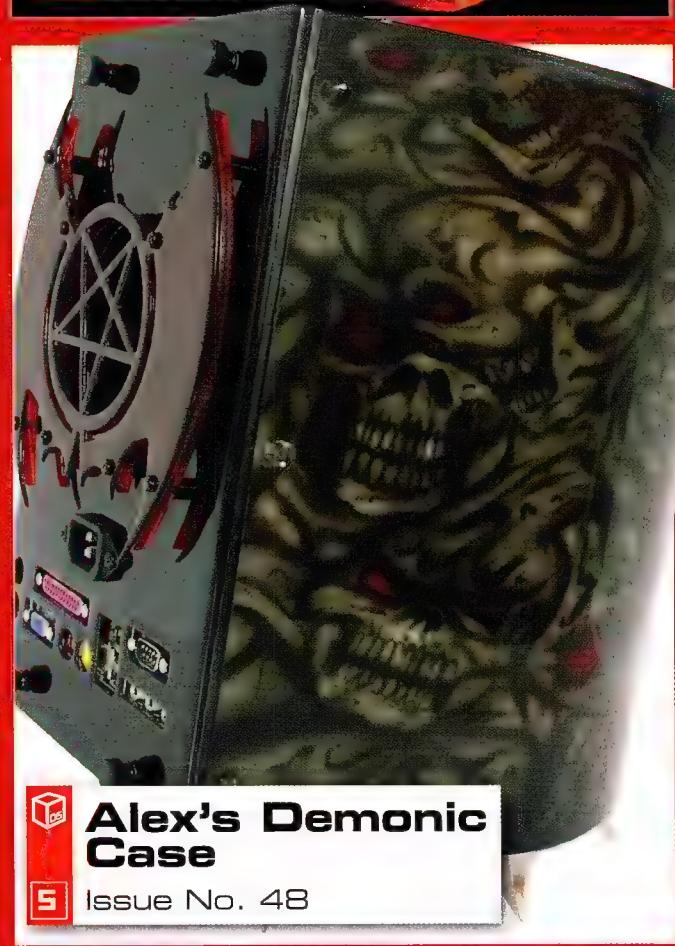
Issue No. 46



### Trevor's Microwave Magic



Issue No. 47



### Alex's Demonic Case



Issue No. 48



### G-gnome's Orac3



Issue No. 50



**Mark's Scanner Box**

Issue No. 51



**IRumPiG's Rig**

Issue No. 52



**Raygen's Parabox**

Issue No. 54



**Vando's Briefcase PC**

Issue No. 55



### Travis' Cool Cube

Issue No. 53



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Issue No. 56

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## hotbox OF THE YEAR

# \$3000 WORTH OF GEAR

**N**ow, a winner must be chosen! There can only one – only one Hotbox of the Year and it's up to you, Atomic readers, to decide who will win. The awards are many – fame, fortune, and swarms of scantily clad members of the opposite sex swamping them in the street. Who will win? Who will hold the title of Hotbox of the Year for 2005?

Thanks to Biostar, NVIDIA and Westen, this year's winner will receive a wonderful blank canvas with which to build a new beastly, sexy system. Built around NVIDIA's nForce 4 chipset, a top-end Biostar motherboard, cutting-edge Intel or AMD CPU and brand spanking new 7800 GTX video card, this is the ultimate prize for one lucky Hotbox modder – to the tune of \$3000!

So get voting!



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**Why is there no winner for issue 49?** Prior to that issue, Hotboxes were displayed in the magazine, while the winner was announced online. For issues 50+, this was reversed. This had the side-effect of featuring a box over two issues.

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# technique

Hands-on tutorials, tips, and tweaking for the technically inclined.

technique contents

## this month

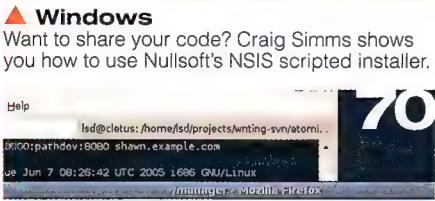
Setup will install Atomic Install 2.5 in the following folder. You can click 'Browse' to change the folder. Click 'Install' to start the installation.

Destination Folder  
E:\Program Files\Atomic Install

Browse...

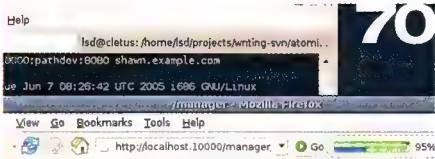
Space required: 0.0KB  
Space available: 5.6GB

Next >| Back <| Stop | Refresh | Help



### Windows

Want to share your code? Craig Simms shows you how to use Nullsoft's NSIS scripted installer.



### Linux

Bah! Firewalls are for pansies! Leigh Dyer shows you how to tunnel past them in style.



### Hardware

Ron Prouse has a message for you – don't buy an iMac Mini, make your own!

## tiny tweaks

### Network shuffle

Do you frequently change the address assigned to your NIC?

It can be a pain going through all those dialogs all the time, just to enter a few numbers. Thankfully, there's a solution that makes things easy. 'NETSH' is the command we want, and with it you can alter pretty much anything related to your network card.

Say you want to alternate the IP address on our main network interface between 192.168.0.1 and 10.0.0.3 – create a shortcut with the location:

**netsh interface ip set address "Local Area Connection" static 10.0.0.3  
255.255.255.0 10.0.0.1 1**

This sets a static IP 10.0.0.3 and a subnet mask 255.255.255.0 with a gateway of 10.0.0.1 and the metric of the gateway to 1. You can then create another shortcut to set it back.



### Evinceability

If you're sick of all the usual PDF viewers for Linux, then you should try Evince ([www.gnome.org/projects/evince](http://www.gnome.org/projects/evince)), a new GNOME-based document viewer.

It uses a new PDF rendering library called Poppler, and opens PostScript files as well, with plans to support new formats in the future. The real beauty lies in the interface though – clean and simple, with a continuous scrolling mode that lets you quickly skim through the pages of a document instead of having to scroll pages one at a time.

Unfortunately there's no browser integration with the like of Firefox (is there any other?), but of course this will eventually come, just like full-time in a soccer match. Or football.

For now Evince is still young, but it's already a much better PDF browser than xpdf and GPDF, so if you're tired of the alternatives grab Evince today or keep an eye out for it in your favourite distribution.



### Boring begone

One of the 'boring bits' to the perfect case mod are those unsightly expansion bay modules – the ugly beige plastic lumps that house additional ports. It seems that with each generation, as onboard capabilities become more comprehensive, there is an increase in these PCI 'daughter slots'.



The wires are easy enough to mod, but what about the nasty modules themselves? Thankfully, salvation is just a spray can of vinyl dye away! Remove the PCI bracket where possible, mask up the external connectors and internal wiring, and spray them with a shade that will complement, rather than detract, from your chosen colour scheme. For preparation, clean the plastic over with some turpentine or grease remover. A final, heavier coat will give the module a solid cover that will be reasonably durable in normal conditions.

**No no, we NSIS**  
**Craig Simms** installs his package wherever he pleases. Heh.

**N**ullsoft brought us many good things in the years before Justin Frankel split – WinAmp, Waste and Gnutella to name a few, as well as a plethora of lesser known projects. One that doesn't get nearly enough attention is NSIS – the Nullsoft Scriptable Install System. With this wonderful tool you can create your own install programs, without having to fork out hundreds for the hideously over priced Wise or InstallShield packages.

**Install!**

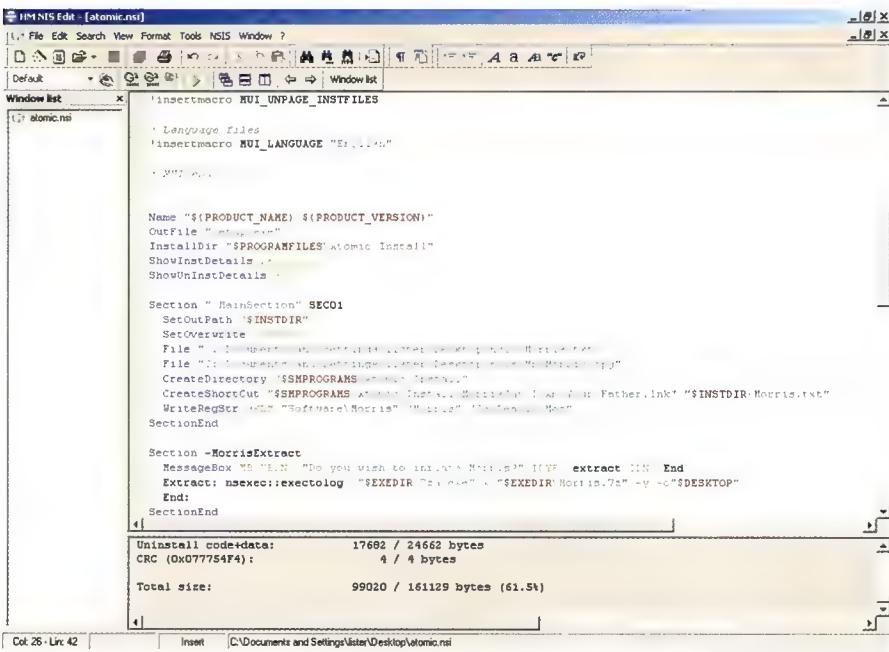
As the name suggests, NSIS uses scripts which are ultimately compiled into a final executable. As with all things code-wise, there's a specific format NSIS requires, and the easiest way to learn this structure is to build a sample install file – so let's get to it!

First, grab NSIS from [nsis.sourceforge.net](http://nsis.sourceforge.net)

and install it. While you can do everything from a text editor of your choice, if you want to make life easy as well as have the benefit of context sensitive highlighting, grab HM NIS EDIT from **hmne.sourceforge.net** – we'll be using it for this tutorial.

First we need to prepare our files we want to install. Create a folder, and copy in the files you wish to be installed. These will eventually be called into the script for compression into a single executable. For the sake of this article, let's assume they're called 'Morris.txt', 'MrsMorris.jpg' and 'Morris.lnr.hint'

Open up HM NIS Edit. Go to File --> New Script From Wizard, and enter the appropriate details. This will set up the header of the installation script for you. We've named ours Atomic Installer, but you're welcome to use anything you like. Choose the modern GUI,



▲ It looks scary, but HM NIS Edit makes things a whole lot easier for n00bs.

**NSIS Script Wizard**

**Application Information**  
Please specify some basic information about your application.

Application name:	Atomic Install
Application version:	2.5
Application publisher:	Haymarket Media
Application website:	<a href="http://www.atomicmpc.com.au">http://www.atomicmpc.com.au</a>

< Back    **Next >**    Cancel

▲ 'You're a wizard Harry!' 'Who are you calling Harry?'

and alter any other settings you desire.

Next we get to choose the installation directory, by default **\$PROGRAMFILES\Name**

**of Program.** \$PROGRAMFILES is for all intents and purposes a symbolic link or variable – wherever this symbol appears, the installer queries the operating system as to where the program files directory exists, and then adjusts its output appropriately. Not only does this mean portability across configurations, but more often than not it means less typing! Always a bonus. Whatever you enter here will then be stored as the symbol \$INSTDIR. Several other symbols also exist that can be used throughout your code – see the *Common symbols* sidebox for the most commonly used ones.

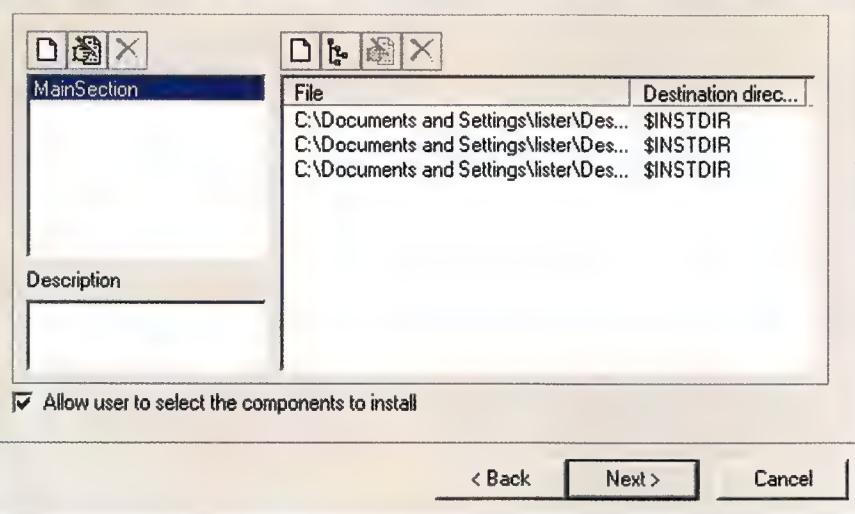
On the same dialog, you can include a license if you want, to be displayed inside the installer – simply leave the field blank if you wish to skip it.

Click Next and hit the Add File button (the second white page icon), and add all of the files we moved into our folder earlier. Check 'Allow user to select the components to install'.

Now we need to set up any Start Menu icons that we wish to install. Creating an internet shortcut will do as it says, using the website details you entered on the first page, and is

**NSIS Script Wizard****Application Files**

Please specify the files that are part of your application.

**▲ And a file over here, and a file over there...**

selected by default. Click the New Shortcut button. Use the lower drop down box to select the file you wish to appear in the Start Menu, then select \$SMPROGRAMS from the top drop down menu.

You'll want to alter the string to include your program folder – so for our install, if we wanted to create a shortcut to 'MorrisJnr.hint' in the Start Menu with a more descriptive name, we'd enter something like **\$SMPROGRAMS\Atomic Install\MorrisJnr I Am Your Father.lnk**.

You can also set up any desktop icons in the same manner by using the \$DESKTOP symbol instead. Skip the next step for now, hit Next at the window after that and then hit Finish.

**Script Revision**

Holy crap on toast! That's a lot of code. Let's take a look at the different sections that have been generated.

The first section is simply the information we entered on the first page of the wizard, with additional uninstall data being written to the registry.

Next we're including the libraries required to use the Modern UI (MUI.nsh). **!define**

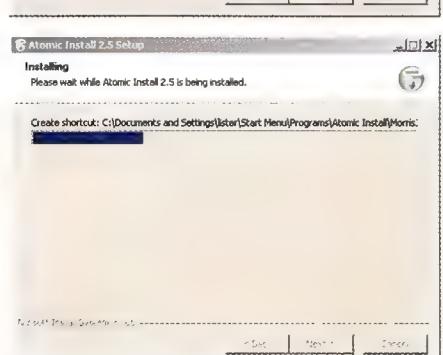
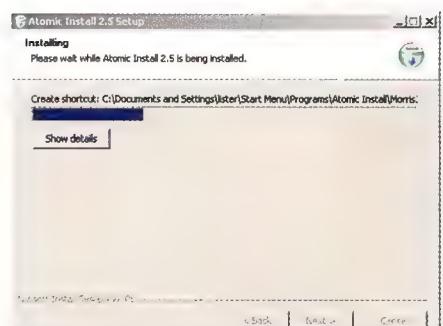
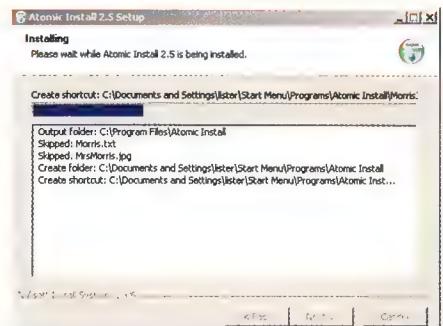
**MUI\_ABORTWARNING** tells the installer to display an 'Are you sure?' style message when the user tries to cancel. Following this are our install icons and uninstall icons – in the modern UI, the install icon will appear as the icon for the program, in the title bar of the program and as an image in the top right. Be aware that your install and uninstall icons must contain the same

number of icons, in the same size and colour depth order. If this makes no sense to you, that's OK, just play it safe and use the default icon set or any of the matching sets provided in the '\Contrib\Graphics\Icons' subfolder off your NSIS directory.

Following this we have what pages will appear in the installer, and in what order. By default there's a Welcome screen, followed by a screen allowing the user to install the components they wish, then a screen allowing the choice of install directory. **MUI\_PAGE\_INSTFILES** is the install progress page, then we have the finish page, the uninstaller page and the language file.

The **!define** key that you see littered all about the place is essentially creating a symbol – if you use the symbol **\$(PRODUCT\_NAME)** after using **!define PRODUCT\_NAME**, it will link back to the **PRODUCT\_NAME** argument you entered at the top of the script, in this case 'Atomic Install'. As you can see, this methodology is used for the Name variable, which is next in the script. This is what the installer will call your program throughout the process, and include in the title bar.

**OutFile** is the name of the executable that will be produced upon compilation (and will be generated in the same directory that your .NSI file is in), and **InstallDir** is where the files will be installed by default. If you comment out the **MUI\_PAGE\_DIRECTORY** macro earlier with a semicolon, the files will be forced to be installed to the default directory.

**▲ The installer in Show, Hide and Nevershow modes.**

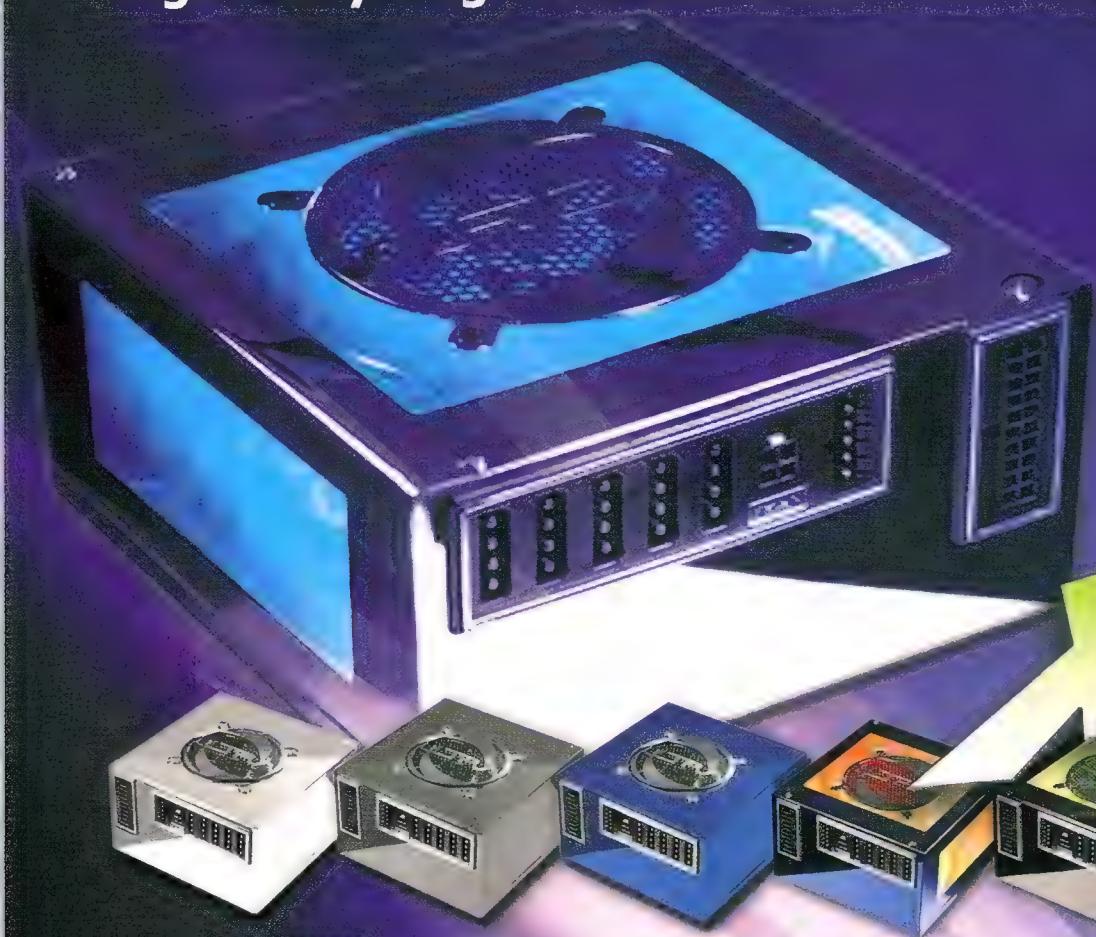
Next up is **ShowInstDetails** and **ShowUnInstDetails**, which have the arguments **Show**, **Hide**, and **NeverShow**. Show displays the details as the program installs, Hide displays a progress bar with a button to 'Show Details' if the user desires, and NeverShow displays only a progress bar with no option to view the install process. Note that you can get all the valid arguments for an instruction at anytime by hovering the mouse over it in HM NIS Edit.

**Public Peace Section 9**

The meat of the NSIS script is the section. Sections allow not only neat organisation of code, but cool things like user defined installable components. Sections are executed in order, unless their name begins with 'un.' or is 'Uninstall', in which case they are reserved for uninstall functions. Other special functions include prefixing the '-' symbol to the name (it will not appear in the component install

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screen and will be force installed), prefixing a '!' (item is displayed in bold) and adding a **/o** immediately after **Section** (that section will be disabled by default in the component install screen).

Let's take a look at our first section, **MainSection**. **SetOutPath** determines where the files within that section will be installed. This means rather than being restricted to the installation directory you entered earlier, you may deliver files within a section to custom directories – such as installing DLL files to the Windows System directory, or the desktop.

Files are added to the installation package by using the **File** instruction, followed by the location of the file on the local drive – as you can see, the Morris family is already here, as set up by our wizard. This is followed by the installation of shortcuts, and most importantly, the end of the section, funny enough called **SectionEnd**.

So let's give the user more options and move 'MorrisJnr' out of MainSection and into a new section, disable him by default and place him on the desktop.

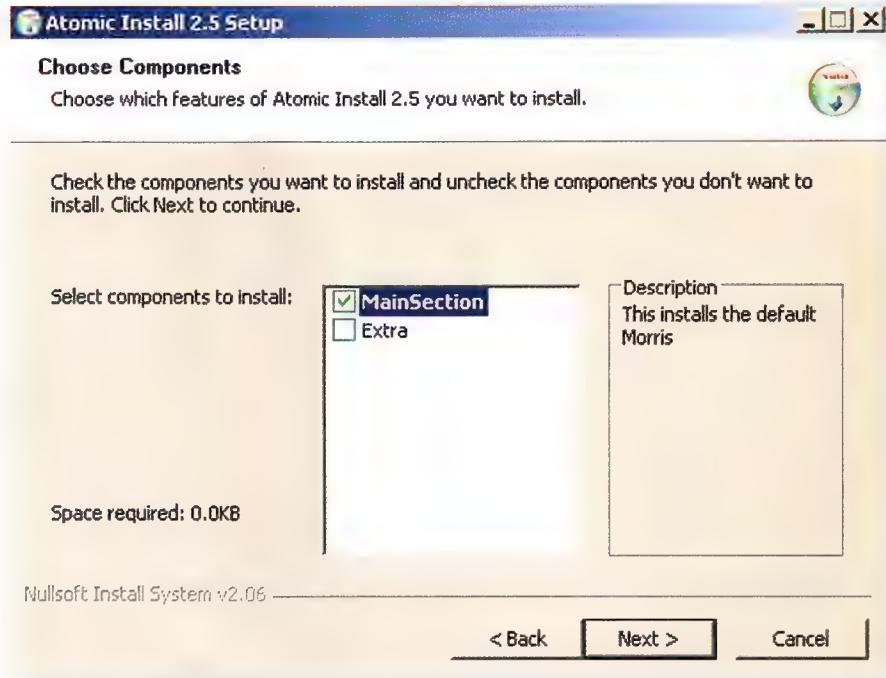
```
Section /o "Extra"
SetOutPath "$DESKTOP"
SetOverwrite ifnewer
File "C:\nsis\MorrisJnr.hint"
SectionEnd
```

Easy! Now if we compile and run (Shift+F9 – if you wish to just compile and not execute hit CTRL+F9), you'll be able to see the installer in its current state, and that the user now has the option of installing 'MorrisJnr' or leaving well alone.

Often the user likes to know exactly what they're installing, so lets add descriptions to our sections that will be displayed in the components page whenever the user mouses over the available options. Scroll down until you find the comment ; **Section descriptions**. Contained in this area are all the descriptions for our sections, formatted as so:

```
!insertmacro MUI_DESCRIPTION_TEXT
 ${Section Index} "Description goes
 here"
```

You'll notice something similar already in the script. Scroll back up to MainSection – notice the **SEC01** at the end? This is our Section Index and allows us to reference sections in order to add descriptions, among other things.



### ▲ The default Morris comes with text action forehead. Pupils not included.

So our final line for the MainSection description would look something like this:

```
!insertmacro MUI_DESCRIPTION_TEXT
 ${SEC01} "Installs Morris' Main
 Package"
```

For completeness, add a **SEC02** to the end of our **Extra** section and insert a description for it as well.

### External Commands

So let's say we compress Morris.txt into a 7z file. We don't want to include the 7z file in the installer, but we do want to be able to extract it as part of the install process. How do we do this?

First, and most obviously, we either need the executable that performs the extraction in the same directory as the installer, or available somewhere on the local machine. In this case we need to include 7za.exe from the 7-zip compressor, and then to call it externally from the script. To do this, we use the **exec** command.

```
exec """$EXEDIR\7za.exe" x "$EXEDIR\
Morris.7z" -y -o"$DESKTOP""
```

Note that the argument is contained within single quotes, and that NSIS symbols can be used. If we want the install progress to halt until the external process has terminated, we can use **execwait** instead of **exec**. Argh!

But wait! Now we've got an ugly Command Prompt window that's popping up, ruining our lovely install! Is there any way to hide, or internalise it? Why yes, yes there is.

NSIS supports a plugin structure, much like WinAmp. One such plugin is NSEEXEC – which will happily capture and display any command line output to the details box within the installer, hiding away all those ugly Command Prompt windows. To use, simply replace **exec** with **nseexec::execolog** (which is in the format **plugin::function**, and how plugins are called from the script). If you don't wish the output to be displayed, simply use the **exec** or **execstack** functions instead of **execolog**.

### Message in a Box

Instead of force extracting Morris.7z, let's give the user the option of inflating him through a message box.

```
Section -MorrisExtract
MessageBox MB_YESNO "Do you wish
to inflate Morris?" IDYES Extract IDNO
End
Extract: nseexec::execolog "$EXEDIR\
7za.exe" x "$EXEDIR\Morris.7z" -y
-o"$DESKTOP"
End:
SectionEnd
```

Here we've told NSIS not to display the section as an installable component by prefixing it with a '**-**', and then executed the MessageBox

instruction with the function MB\_YESNO, which will create a message box with Yes and No buttons. We have then included the question to appear in the box, and said that if the user clicks YES, go to subsection 'Extract' (and consequently, inflate Morris), but if the user clicks NO go to subsection 'End' (which has no commands, and then continues to SectionEnd). A subsection is simply defined by using the previously implemented name and following with a semicolon, as above.

## That'll Be the Reg, Reg

You can also add or delete registry keys straight from NSIS, using WriteRegStr, WriteRegEXPANDSTR, WriteRegDWORD, or WriteRegBin in the format:

```
WriteRegXXX Root_Key Sub_Key
Key_Name Value
```

Let's leave some evidence behind of our install. To write a string called 'Morris' to the 'HKEY\_LOCAL\_MACHINE\Software\Morris' key with the value 'Is Really Moz', it would be written as such:

```
WriteRegStr HKLM "Software\Morris"
"Morris" "Is Really Moz"
```

You can also remove entire keys by using the **DeleteRegKey** instruction, or individual values by using **DeleteRegValue**, using the same

format as above. For cleanliness, make sure to add a remove instruction to the uninstall section for any registry keys that you may have added along the way.

## Customising

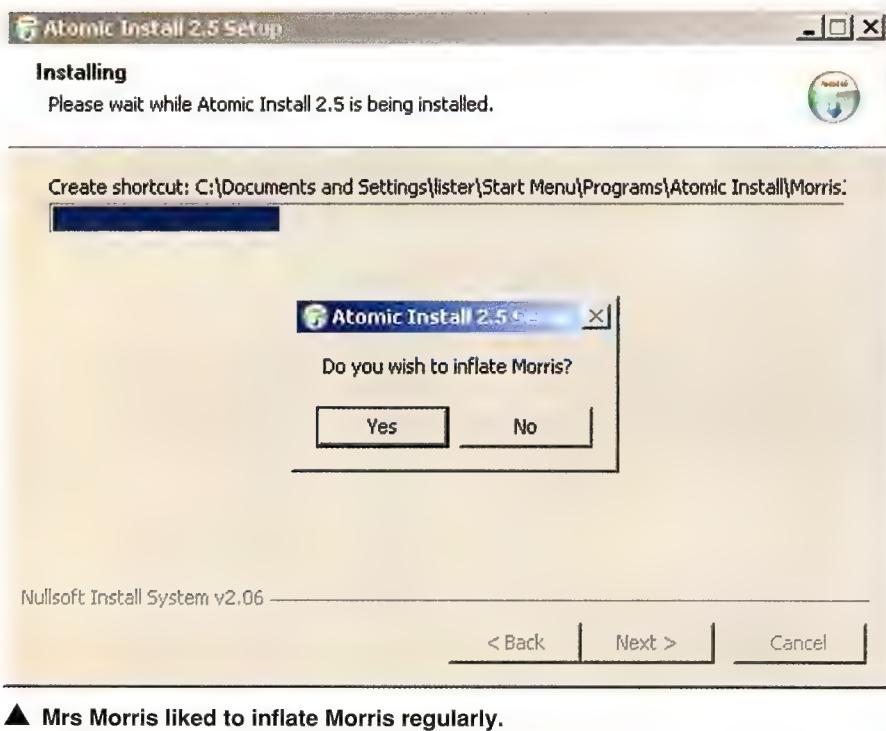
You can also customise the look of the installer. Since we've called macros for the modern UI here rather than coded our own calls, we'll have to edit the Contrib\Modern UI\System.nsh (called by the script MUI.nsh) file rather than entering the arguments directly into the script, which would cause clashes. Browse down to line 100 to find the interface settings. Here you can change everything from the interface colours down to the image used for the sidebar (MUI\_WELCOMEFINISHPAGE\_BITMAP) – see the ModernUI Readme installed with the program for the complete details.

## Uninstall!

There it is, an introduction to the magic of NSIS. The program is far deeper than the size of this article will allow, so now that you've got a feel for it, have a browse through the manual to see what you can do.

Through its extensible plugin architecture you can do nifty things like display splash screens, download files from the internet through HTTP and even binary patch existing files – all so your creation can be delivered in the best possible way.

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## Common Symbols

### \$PROGRAMFILES

Your Program Files directory. Usually C:\Program Files.

### \$COMMONFILES

The Common Files directory. Usually C:\Program Files\Common Files.

### \$TEMP

Your temp directory. Usually C:\Documents and Settings\Profile Name\Local Settings\Temp.

### \$DESKTOP

The current profile's Desktop.

### \$SYSDIR

The system directory, usually C:\Windows\System32.

### \$EXEDIR

The directory that your installer executable is in.

### \$WINDIR

The Windows directory, usually C:\Windows.

### \$STARTMENU

The current profile's Start menu directory. Used to add shortcuts to the top of the Start Menu.

### \$SMPROGRAMS

The current profile's Programs menu directory, found under their Start Menu. Used to add shortcuts.

### \$SMSTARTUP

The current profile's Startup directory, found under Start Menu>Programs. Add a shortcut here to launch programs when Windows starts.

### \$QUICKLAUNCH

The current profile's Quick Launch Bar. Used to add shortcuts.

### \$INSTDIR

The install directory you've set.

### \$(NSISDIR)

The NSIS directory. Usually used to include resources such as icons.



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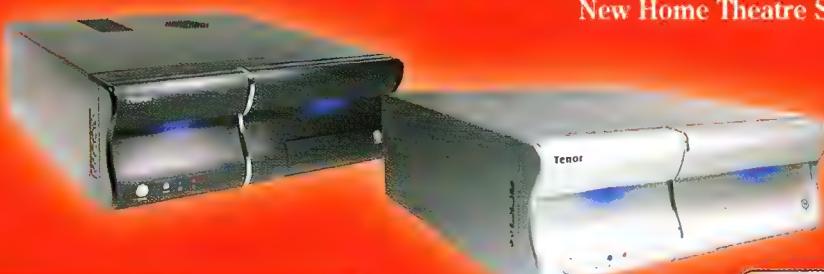
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\* All black cases have a steel chassis

\* All silver cases have an aluminum chassis

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Front Accessible Internal	3 x 5.25" x 3.5" 3 x 3.5"	
Material	Chassis: 1.0 mm SECC. Front bezel: Aluminum made	
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Motherboards	ATX, Micro ATX	



Rear Fan (Exhaust)



Front Fan (intake)

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# Tunnelling for fun and profit

**Don't let pesky firewalls get in your way!**  
**Leigh Dyer shows you how to tunnel past**  
**to freedom on the other side.**



You're at work. You're bored. You go to browse [www.penny-arcade.com](http://www.penny-arcade.com) and discover the bastard sysadmin has firewalled the site. What? No one stops you browsing where you want to browse. *No one!*

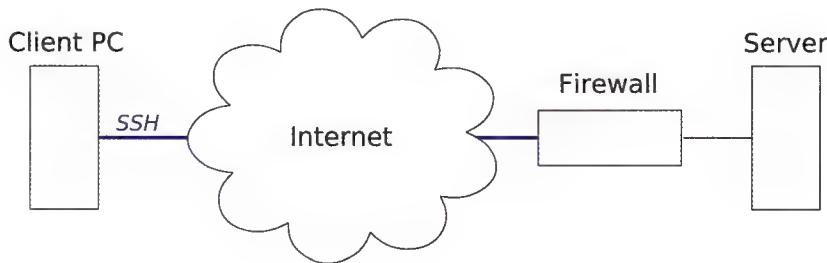
No problem. Got a firewall in your way? Tunnel around it, *Atomic* stylez.

## The world is your pipe

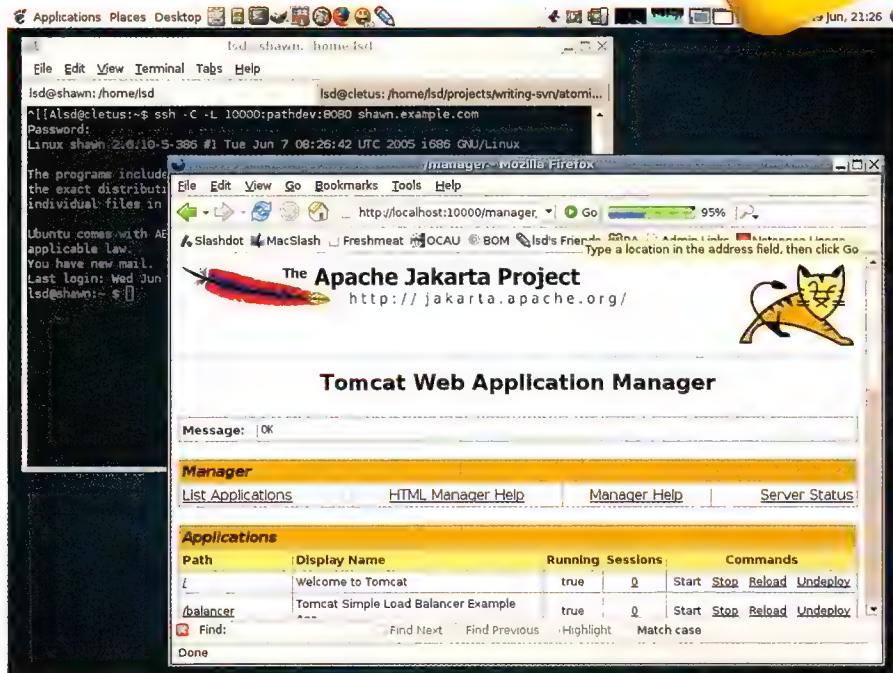
Tunneling in the network sense is the art of using one kind of connection to carry a completely different type of traffic. With the right tools in place, you can pull off all sorts of neat tricks, like running SSH connections through your work or uni's web proxy, or get secure, encrypted access to services safely tucked away inside the office firewall. Let's look at some of the options you can use.

## SSH follies

SSH really is a Linux user's best friend, not only giving you secure remote logins, but also shining as a tool for tunnelling arbitrary TCP connections. Because these are encrypted in exactly the same way as your remote login sessions, it's perfect for accessing services running behind your home or office firewall; think of it like a poor (or lazy) man's VPN.



▲ An SSH tunnel can encapsulate and encrypt traffic through a firewall.



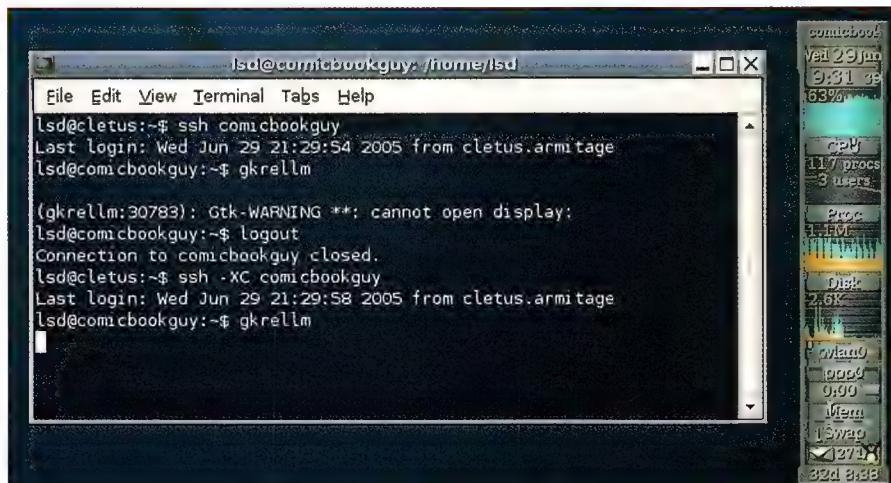
▲ SSH tunnelling can be handy for securely accessing sensitive internal websites

For instance, say you've got some kind of web application running on a machine on your office network that isn't exposed directly to the internet, but you need to access it from home. If there's another machine at the office that can

access the box you're after, and which you can access via SSH, you can build a tunnel and have the SSH server at the other end forward the connection for you:

```
ssh -L 10000:webbox:80 sshbox.office.com.au
```

The login to the SSH server runs as usual, but the `-L` option creates a tunnel, forwarding connections from localhost port 10000 through the tunnel to port 80 on 'webbox'. The tunnel endpoint can be anything the SSH server can access, and can be either an IP address or hostname. In the latter case, the name is looked up on the server, so you can use names that are only available inside the network. One neat trick that SSH can do with its tunnelling is handling



▲ Running GKrellM using X-over-SSH is a quick, though somewhat inelegant, way to check server load. It also looks cool.

remote X connections. Add this option to the `/etc/ssh/sshd_config` file on the server:

#### X11Forwarding yes

Then, reload the server:

**sudo /etc/init.d/ssh reload**

Login using the `-X` option to enable X forwarding. If you're on a slow connection (anything non-LAN really), use the `-C` option to enable compression as well:

**ssh -X -C sshbox.office.com.au**

You should now be able to run any X app you like, and the windows should appear on your local desktop.

## A (slightly) less poor VPN

One of the only issues with SSH tunnelling is that SSH connections have an annoying habit of timing out when left inactive.

The answer is AutoSSH, a nifty little tool that starts the SSH connection for you, bringing it back up for you automatically when it dies. The only catch is that, for this to work, you need to set up key-based passwordless logins.

We looked at setting up key-based logins as part of the clustering feature last month, but the quick run-down is that you need to use the 'ssh-keygen' tool to generate a key on the client machine, and add the contents of the public key file to the '`~/.ssh/authorized_keys`' file on the server machine.

If you set a passphrase on the key, and it's highly recommended that you do, then you need to have an ssh-agent session running

to cache a decrypted copy of the key in RAM. Most distributions run their X sessions under ssh-agent out of the box, so you just need to use 'ssh-add' and enter your passphrase to add the key to ssh-agent's memory store. AutoSSH itself is quite easy to install and use:

**1 Grab the AutoSSH tarball from the website [www.harding.motd.ca/autossh](http://www.harding.motd.ca/autossh)**

**2 Extract the tarball, change in to its directory, and run the build:**

```
tar zxvf autossh-1.3.tgz
cd autossh-1.3
make -f Makefile.linux
```

**3 If the build succeeds, install the binary:**

```
sudo make -f Makefile.linux install
```

**4 To use AutoSSH in its simplest form, simply use it instead of 'ssh', with a '-M 0' added to the command line:**

```
autossh -M 0 -L 10000:webbox:80
sshbox.office.com.au
```

The `-M` option specifies a port number, which autossh uses to set up a tunnel of its own that it can send test data through to test whether the link is up. Setting it to 0 disables this testing, so AutoSSH only restarts the SSH client if it exits. See how you go with this setting, but if you find the connection isn't stable, try specifying an empty port (say, 20000 or so) instead. And if you find actually getting access is a problem, read on.

## Dealing with restrictive networks

So what about when you're trying to bypass an overly paranoid sysadmin's firewall at work or uni; or you want to access more than the local net café will allow?

It's all well and good for *normal* people to be restricted to a number of basic services, but any real geek is naturally offended at such meagre rations to the Net.

There's a variety of tricks you can use to tunnel connections through just about any connection that lets you get some form of traffic out to the internet. They've all got one thing in common – you'll need a server on the outside to act as the other end of the tunnel. Running this stuff on a box at home on an ADSL connection is good enough for this purpose.

## Corkscrew

Corkscrew tunnels SSH connections through HTTP proxies. There's an important distinction to make here – Corkscrew uses HTTP proxies, but it doesn't actually tunnel your data in HTTP packets. Instead, it uses CONNECT requests to the proxy to get a simple proxied socket connection, a trick that HTTP proxies support to allow SSL connections.

In fact, to prevent exactly the kind of abuse we're proposing, many HTTP proxies are configured to only allow CONNECT requests when the destination is port 443, the standard HTTPS port. If your HTTP proxy is like this, you'll need to tell your SSH server to listen on this port, as well as the standard port 22.

To use Corkscrew add this line to your `/etc/ssh/sshd_config` file on your server at home:

### Port 443

Then, reload the SSH server configuration:

**sudo /etc/init.d/ssh reload**

On your client system, install corkscrew from packages or from the source tarball at [www.agroman.net/corkscrew](http://www.agroman.net/corkscrew). To get the SSH client using it, edit your `~/.ssh/config` file and add the following line, entering your own proxy details:

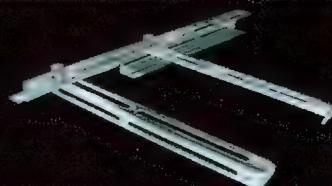
```
ProxyCommand /usr/local/bin/corkscrew proxy.net.com 8080 %h %p
```

If everything has gone well, you should now be able to connect to your SSH server through the proxy, using port 443 (with the `-p 443` option) if necessary. If you don't have any luck though,

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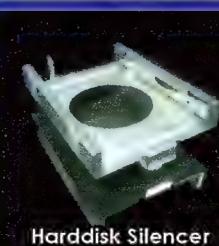
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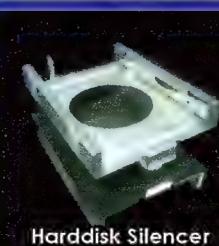
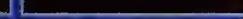
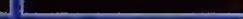
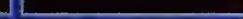
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the proxy may not be set up to allow CONNECT requests at all, but don't worry – we've got a few more tricks up our sleeves.

## httptunnel

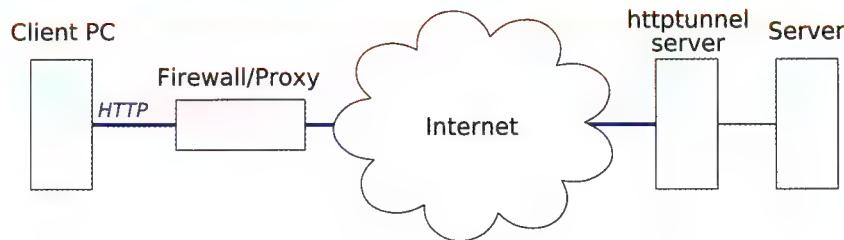
httptunnel is a tunnelling tool that lets you carry any TCP connection over a HTTP proxy. Unlike Corkscrew, it actually encapsulates the packets in HTTP requests, so it should work with just about any HTTP proxy. A server application, which you'll need to run somewhere, receives the encapsulated packets and strips out the contents, forwarding them to their destination. When the response comes back, it's encoded in to a HTTP response and returned back through the proxy to the client.

Once you've installed httptunnel on your server and client PCs – most distributions include packages, or you can grab the source from [www.nocrew.org/software/httptunnel](http://www.nocrew.org/software/httptunnel). **htmt** – you should be ready to build some tunnels. You'll usually find it best to focus on tunnelling SSH, since you can use it to tunnel everything else you might want.

After installing httptunnel on the server (ie, your box at home) run something like this:

```
hts -w -F localhost:22 -w 8000
```

This creates a httptunnel server that decodes incoming HTTP connections to port 8000



▲ **httptunnel encapsulates network connections in HTTP traffic**

and forwards the contents on to port 22, the SSH daemon.

Then install httptunnel on the client machine (at work/uni/inside ASIO headquarters) and use a matthing command that looks like this:

```
htc -w -P proxy.office.com:3128 -F 8000  
homepc.com:8000
```

The httptunnel client listens for connections on port 8000, encoding them and sending them through the proxy to your server. With the tunnel built, you should be able to SSH in to your server box:

```
ssh -p 8000 localhost
```

The SSH client might chuck a wobbly due to localhost having a different key than it expects, something that's unavoidable in this situation.

If the messages bother you, edit your `~/.ssh/known_hosts` file and delete any references to `localhost` before logging in.

One limitation in httptunnel presently is that each server task allows only one client to connect at a time. Because of this, and also because network problems can sometimes cause the client to disconnect without the server realising, it's best to run at least two server tasks on different ports. To run them in the background, drop the `'-w'` option from the command line – this goes for the client as well.

## No HTTP? No Problem!

If you've managed to stumble across a semi-open wireless network, getting an IP but discovering that you can't connect out to anything, you might need to be a little more creative to get your connection out. Now, we're sure no *Atomic* reader would ever dream of pinching a little of someone's bandwidth, but just in case you *did*, you might have to try something more extreme than HTTP.

The next logical step down is ICMP, the protocol that sits beside TCP and UDP and handles all sorts of low-level error and debugging transmissions, including the humble ping. PingTunnel ([www.cs.uit.no/~daniels/PingTunnel](http://www.cs.uit.no/~daniels/PingTunnel)), as the name suggests, builds a tunnel for fowarding TCP connections through a series of ping packets. If you can ping the outside world, you can set up a PingTunnel server and get full connections happening.

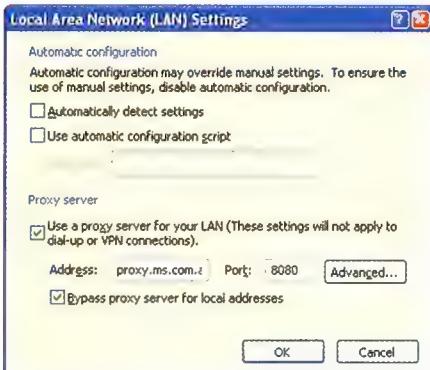
Grab the source code or packages for PingTunnel from the website and install it on both your client and server machines.

For source installs, all you should need is a **make && sudo make install**, though you'll need libpcap (a raw packet capture library) and its headers installed as well.

Running the proxy on the server should be as simple as this **sudo ptunnel**.

On the client, you'll need to specify the PingTunnel proxy server, the local port to forward, and the remote machine and port to forward to:

▲ **If your home broadband connection uses a dynamic IP, use a service like DynDns.org to resolve a hostname you can use in your tunnelling scripts that won't need updating.**



**Not sure what your web proxy is?**  
Check your browser's network configuration details.

```
sudo ptunnel -p homepc.com -l 8000
-d a localhost -d p 22
```

Then, connect to the forwarded port using the SSH client as in the htptunnel example. If all goes well, you should see some debugging messages from PingTunnel, and your SSH connection should go through. The PingTunnel proxy code automatically handles multiple connections from one or more machines, so you don't need to worry about running multiple proxies *a la* htptunnel.

If the connection fails, you may need to turn on packet capture support on the client and/or server by adding the '-c' option and specifying the network interface running the connection that you're tunnelling across:

```
sudo ptunnel -c eth0
```

Even with packet capture support, it can still be a bit fickle, working on some kernels and systems but not others.

## Don't worry momma, it won't get weird

If ICMP is also on the no-go list, the only plausible and (relatively) easy to use option left is DNS – yep, you can tunnel through the mighty domain name resolution service.

Running TCP connections over DNS is a really ugly hack, and the result isn't fast, but if your connection lets you look up external hostnames, there's no reason why it shouldn't work. If you're a brave lad or lass and you've got your own domain name and DNS servers that'll let you configure some slightly odd entries, read on.

The OzymanDNS package is a collection of Perl scripts that do crazy things with DNS, including tunnelling SSH connections over it.

Once you've got a machine ready to run the server, you'll need to create two DNS entries:

- A standard 'A' record called 'ozyman' pointing to the machine that will run the OzymanDNS server.
- An 'NS' record delegating DNS lookups for a subdomain, called 't', to the 'ozyman' name.

If you've got direct access to the BIND zone files on the server, the records should look something like this:

t	IN	NS	ozyman.example.com.
		ozyman	IN A 1.2.3.4

To install OzymanDNS, just grab the tarball ([www.doxpara.com/ozymandns\\_src\\_0.1.tgz](http://www.doxpara.com/ozymandns_src_0.1.tgz)) and extract it on your client and server boxes. Since the apps are just Perl scripts there's no real installation required, but you will need a few Perl packages, including Net::DNS ('libnet-dns-perl' in Debian/Ubuntu), and MIME::Base64 ('libmime-base64-perl'). If the apps don't run, just keep installing the dependencies they ask for until they're happy. Running the server is fairly straightforward:

```
sudo perl nomde.pl -i 127.0.0.1
t.example.com
```

On the client, you need to use the 'droute.pl' as an SSH proxy using the ProxyCommand directive that we used for Corkscrew earlier. To save you editing your .ssh/config file, you can specify this directive on the command line with the '-o' flag:

```
ssh -v -o ProxyCommand="./droute.pl -v
sshdns.t.example.com" localhost
```

It doesn't matter what you enter as the hostname to connect to – the server will always redirect the connection back to itself, so you'll need to make sure that it's running an SSH server as well. However, if all goes well, you should be able to connect and login without problems, beyond the fact that the connection just isn't very fast.

## Remember your wall

Naturally, for all of these tools don't forget to open up ports in your own firewall to ensure the server components they run are accessible from the net. Be aware that your ISP may block

common ports like 80 and 25 for web and mail, and you may need to configure your account to open these if you wish to connect through them.

Another tip is to setup a DNS resolution service for your home machine's dynamic IP, such as [www.dyndns.org](http://www.dyndns.org). Just make sure to add a command to update your entry every time your machine boots or changes IP and you'll be able to reference it by name anywhere in the world at any time, making tunnelling easier from wherever you happen to be.

## If it moves, tunnel it

Hopefully we've shown you that with some clever hacking and the proper resources you can get some kind of network connection running through just about any little firewall loophole you care to mention. We've looked at tunnelling over SSH, HTTP, ICMP, and DNS, but you can bet that somewhere out there, someone's whipped up a delightfully horrid little Perl script to forward connections over just about anything, no matter how impractical.

We'll leave you with that thought, and this example – a Perl script that runs a PPP connection over SMTP, encapsulating packets in emails:

[www.zevv.nl/experiments/div/smtppp](http://www.zevv.nl/experiments/div/smtppp)

Sure, email turnaround times can lead to ping times well in to the minutes, and it's likely to fill your inbox faster than an opt-out spam list, but isn't that half the fun? Enjoy!

## Resources

### AutoSSH

[www.harding.motd.ca/  
autossh](http://www.harding.motd.ca/autossh)

### Corkscrew

[www.agroman.net/corkscrew](http://www.agroman.net/corkscrew)

### htptunnel

[www.nocrew.org/software/  
htptunnel.html](http://www.nocrew.org/software/htptunnel.html)

### PingTunnel

[www.cs.uit.no/~daniels/  
PingTunnel](http://www.cs.uit.no/~daniels/PingTunnel)

### OzymanDNS

[www.doxpara.com/  
ozymandns\\_src\\_0.1.tgz](http://www.doxpara.com/ozymandns_src_0.1.tgz)

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CompactFlash to IDE convertor, \$29.00 [www.pccasegear.com](http://www.pccasegear.com)

AirTouch foldable keyboard, \$39.00 [www.pccasegear.com](http://www.pccasegear.com)

80W DC-DC power supply unit, \$41.80 [www.pcicase.com.au](http://www.pcicase.com.au)

80W PSU ATX daughter board \$57.20 [www.pcicase.com.au](http://www.pcicase.com.au)

IDE cable and convertor for slim ODD, \$8.80 [www.pcicase.com.au](http://www.pcicase.com.au)

Pioneer slot-loading slim DVD-RW+DL, \$253.00 [www.auspcmarket.com.au](http://www.auspcmarket.com.au)

## Tools for this job

The tools used in this tutorial can be found in the average tool shed, including a hacksaw, jigsaw, 100mm vice, tinsnips, grinder and finishing belt, power drill and bits, rivet gun, metal files and sandpaper.

The main requirement is a decent bench or table, providing a solid flat surface to operate on. You will also need an old ATX midi case, aluminium stock and some acrylic off-cuts.

**M**odding tutorials draw their inspiration from many different sources, including necessity, aesthetics and cooling. However this project was undertaken as a result of a readers' dare. The initial feedback was in regard to the hardware review of the Apple iMac Mini (*Issue 51*) and was fairly straightforward in its praise of the mini PC design and its meagre power consumption.

Then the gauntlet was thrown down.

So here's the challenge for *Atomic*: See if you can design and build an equivalent device. It must be:

- Tiny form factor (max 8 x 8 x 3in);
- Consume no more than 30W when running;
- Be very quiet and not get hot; and
- Use Unix or Linux as the OS.

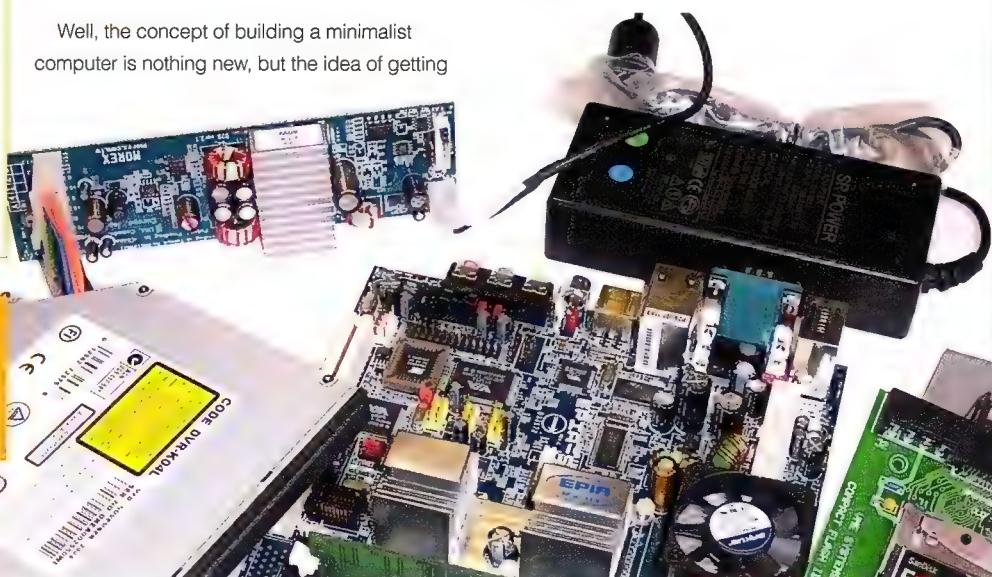
Hardware wise, it needs:

- 256MB RAM;
- Inbuilt 56Kb/s modem, 10/100 Ethernet, USB and FireWire ports;
- Sound (preferably including mic-in);
- A 40GB HD and DVD-ROM/CD burner combo drive; and
- It must look cool and cost no more than \$795 total.

Well, the concept of building a minimalist computer is nothing new, but the idea of getting

its power consumption down to 30W added some spice to the mix. The computer hardware was quickly assembled, including a concept that we hadn't tried before (detailed in *Part 2* of this tutorial) but then came the realisation that we didn't have access to a commercially-available enclosure that fitted the challenge specifications. In fact, if we were going to take advantage of the VIA EPIA motherboard's PCI slot to add wireless capability, then there weren't too many case options available. The 205 x 205 x 75mm size restriction even precluded the new Shuttle G5 chassis that measures in at an enormous 310 x 200 x 185mm. So there was only one easy way out: build our own enclosure.

When you set out to build your own case it is fairly important to acknowledge one thing up-front – any skill or aptitude gap that will separate your fantasies from your capabilities! This isn't meant to sound smug, just a reality check to recognise that building a case from absolute scratch requires the fabrication of attributes that you normally take for granted, such as PCI bays, backplane mounts and the like. It is these components that are the most time consuming, difficult and fiddly to fabricate,



and will often result in the project being prematurely abandoned.

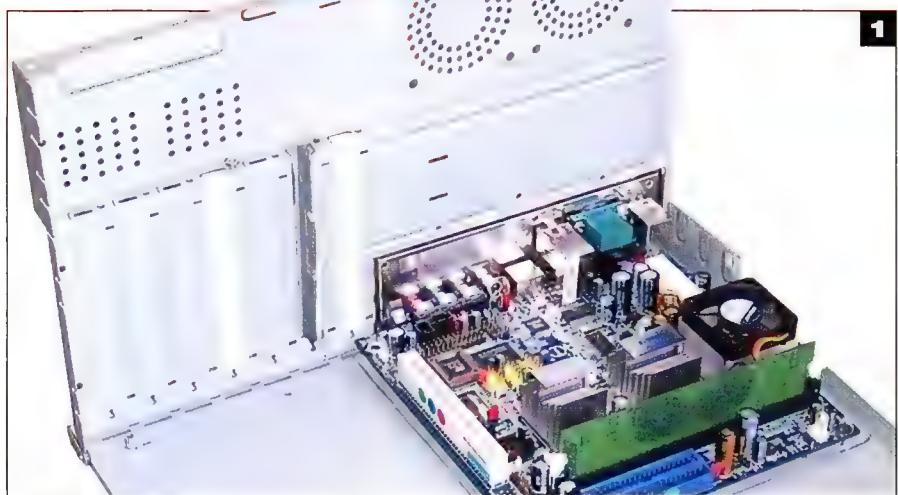
The alternative path – cannibalising these parts from a retail case – might be seen as cheating by some, but it will make life far easier and have little effect on the originality of the finished project. In short, using this method will reduce the sheet-metalworking skill level required to a point where far more people can experience the satisfaction of building it themselves.

**1** The donor case used here was once to be an entry level AOpen KF45A midi tower that was in the wrong place at the wrong time. Cases like this without a power supply can usually be scrounged up for less than \$5 at any swapmeet or PC recycler.

The first step is to draw up a blueprint and measure out how the components are going to fit into the required space. One thing that you won't be able to modify is the location of the motherboard in relation to the backplane and PCI bays, so the logical starting point is to get this section marked out first. Physically fit everything into its intended location and make as many measurements as possible. Remember to ensure that all of the parts will fit in a logical sequence – it is inconvenient to have to pull everything out later, just so you can change a stick of RAM.

**2** With the floor plan measured up, it's time to cut and fold the case into the basic shape. As mentioned, the VIA EPIA SP has a single PCI slot that will be used later, so the design has to incorporate the retention of the first PCI bay – this adds 55mm to the target 75mm height, but the additional functionality is worth it.

Bending sheet metal is easy, getting it into the



shape that you want takes a little more effort! The best backyard method of folding thin sheet metal is to use a straight-edge steel bar clamped in a vice to the inside radius of the fold. Using a set-square for right-angles, draw in some gridlines for each axis so that positioning the bar in the correct place is a straightforward matter of following the lines. When bending, use your body weight against another flat surface (such as a piece of timber) to distribute the force evenly – don't go crazy hitting it with a two-kilo hammer because while this will make you feel good, it will leave dents, stretch the metal and distort the shape.

To keep all of the edges squared off in a sharp 'L' profile, rather than a smoothed out 'U'-shape, bend the metal slightly 'past centre' and then square it back up to 90°.

**3** With the sides and floor bent to shape, the next step is to fabricate a front and rear frame out of 25 x 3.3mm aluminium bar. These end-frames will create the basic backbone

that will provide the box with rigidity and torsional strength, creating a chassis that everything else will eventually attach to. Calculate the length of the sides and top of the case body – these will become the inner dimensions of the framework. Bending the bar to shape is relatively simple, using the same method as before but just using the vice as the support. A set-square is used to ensure that each of the corners is bent accurately across the perpendicular axis, and that each corner is kept at 90°. Keep the set-square and a ruler handy, as you will be using them incessantly from here on! Measure the distance diagonally from corner-to-corner of each frame, as this will be your first indication if something is going amiss.

**4** The front and rear frames are now attached to the case-body with 1/8in rivets, countersunk so that the framework retains a smooth surface for the cover to attach to later. It is important to mention that you will need a flat



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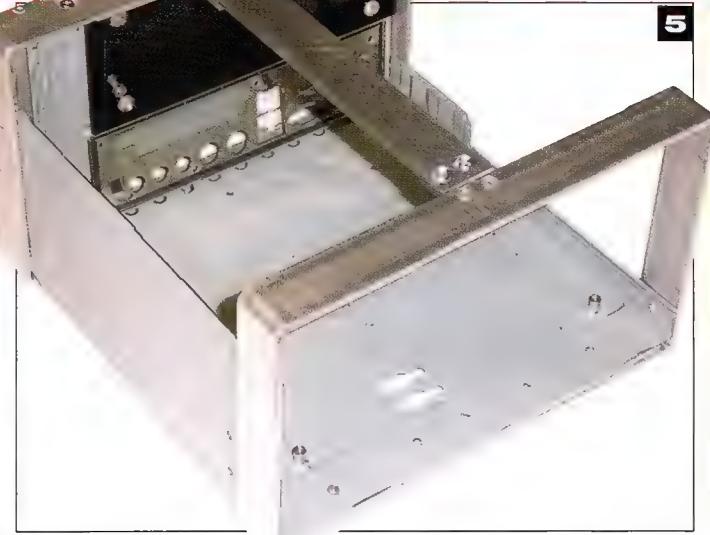
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4



5

and level workspace for this type of construction, as it can dramatically influence the regularity of the final result. When riveting the framework to the body, it is crucial to ensure that the components are attached at exactly a 90° angle to each other on both axis ... or you will end up with a rhombus instead of a rectangle. Everything from here on is reliant on the box being a perfect cuboid, and you can't easily reverse-engineer this step later.

At this point you should be checking the case angles with the set-square before each hole is drilled. If you treat the case as six individual but interconnected sides you really can't make a mistake. The insert shows where the underside of the frame has been ground away where it passes over the PCI bay to allow the PCI-card bracket to mount correctly, and a 3/16in hole drilled so that the securing screw can pass through.

What is the point of all of the scattered metal off-cuts?

There is a tale about a talented Indian stonemason who presented a life-sized, marble sculpture of an elephant to Queen Victoria. The monarch was so impressed with the lifelike appearance of the gift that she quizzed the artist on just how he had captured the living essence of the animal. 'Easy,' he said, 'I just took a very large chunk of stone, and then chipped away all the bits that didn't look like an elephant'.

In this example, the idea is to cut away all of the metal that doesn't remind you of the case that you set out to build.

With the two frame-ends securely mounted to the body, the next step is to tie them together with a cross-beam. This component has to be removable so that the motherboard and optical drives can be easily assembled later. Two 50mm flat brackets are countersunk-riveted to the top centre of each

frame rail, leaving 25mm sticking out to secure each end of the beam. The beam is cut to length so that it is a tight 'press fit' into position, and then two 2mm pilot holes drilled through both thicknesses at the ends.

The holes in the beams are then enlarged to 3mm and countersunk, while the holes in the brackets are threaded with a 3mm die. Standard computer case screws can then be used to bolt the removable beam in place. The power supply's bare PCB will be mounted to the case above the I/O plate so, as a precaution, a 2mm section of acrylic has been screwed to the back of the case with nylon screws as an insulating plate.

With the basic chassis constructed, the next step is to fabricate two brackets for attaching the front bezel, using sections of aluminium 'L'-bracket riveted to the sides of the frame. These brackets have been bent slightly inwards over their length, so as to place some spring tension on the bezel when it is screwed onto the front. This will stop vibration rattles and keep the bracket pressed hard up against the optical drive carrier.

At this point, all of the sharp edges, corners and burrs should be filed off and sanded smooth with 600-grit Wet'n'Dry sandpaper. All of the alloy

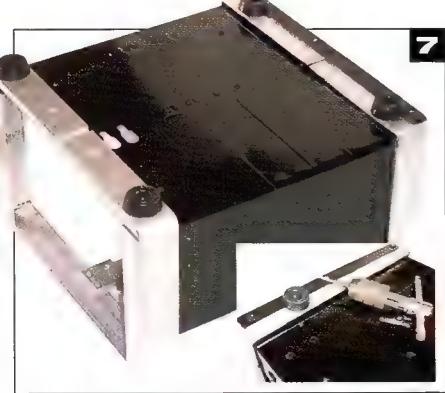
components are then masked off, and the original grey sheet metal painted black with a high gloss black automotive finish. This is not just an aesthetic touch, but to stop corrosion of the case where the steel has been cut and ground. The aluminium components will be polished during the final clean-up to add some hi-tech credibility to the project.

Once the paint dries, the next step is to add some legs and get the project off of the ground! The legs in our project were made from some rubber items that were salvaged from an old amplifier, chosen because they had a low profile and were soft enough to allow for any small fluctuations of the case floor height. Once properly positioned, drill a 2mm pilot hole and use a 3mm tap to thread the holes to accept standard computer screws and flat washers .

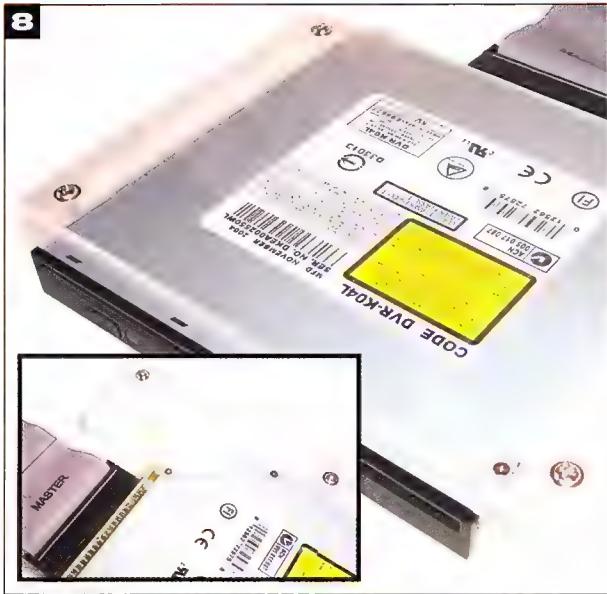
Moving into the inside of the case, the first challenge is to find a method of securely mounting the optical drive. Clamping it down with brackets is out of the question, as even slightly distorting the drive framework would upset the minute tolerances within – not only tiny in size, they are also very flimsy and



6



7

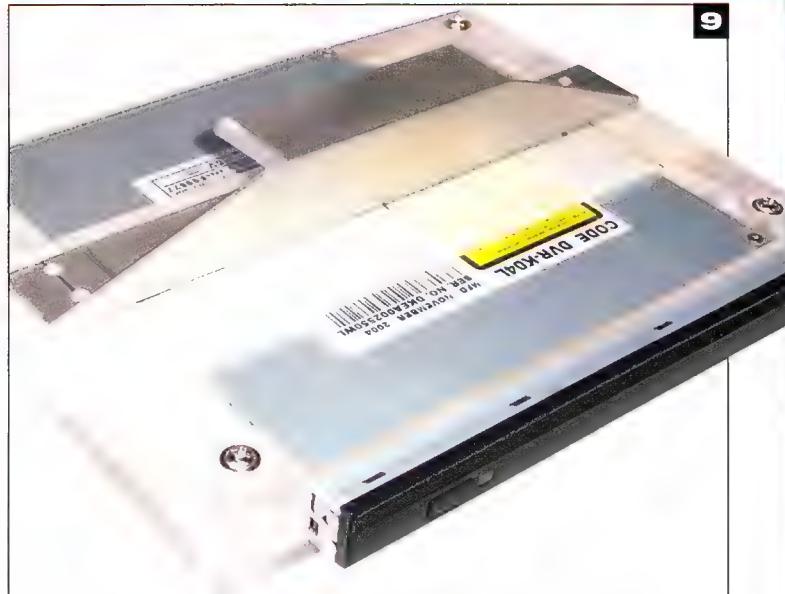


fragile. Taking a page from laptop design in order to get the drives to fit securely, you'll need to fabricate a support that conforms to the drives' outer dimensions. For this project, we decided to laminate a support out of acrylic sheet. Four layers of acrylic were cut to shape and glued together, with a fifth layer used as a screw-down top – this allowed for easy assemblage later. The insert shows how each layer was cut to the shape of the drive casing so that it is supported securely. The drive protrudes through far enough so that it can be positioned 'flush' with the front bezel. At this point a slim ROM-to-IDE convertor was securely mounted to the drive.

**8** The next step in mounting is to ascertain the centre of balance for the drive, as it is going to be hung down from the cross-beam. It might seem pedantic, but if the drive is left dangling in mid-air then the natural outcome of an unbalanced gyroscopic force is going to be induced vibration of both the disc and the

drives' anti-jitter dampeners. The possibility was removed by balancing the assembly across a ruler-edge and using that point as the centreline of the mounting bracket. Even if it is a load of wank, we will sleep better at night knowing that it has been done with performance in mind!

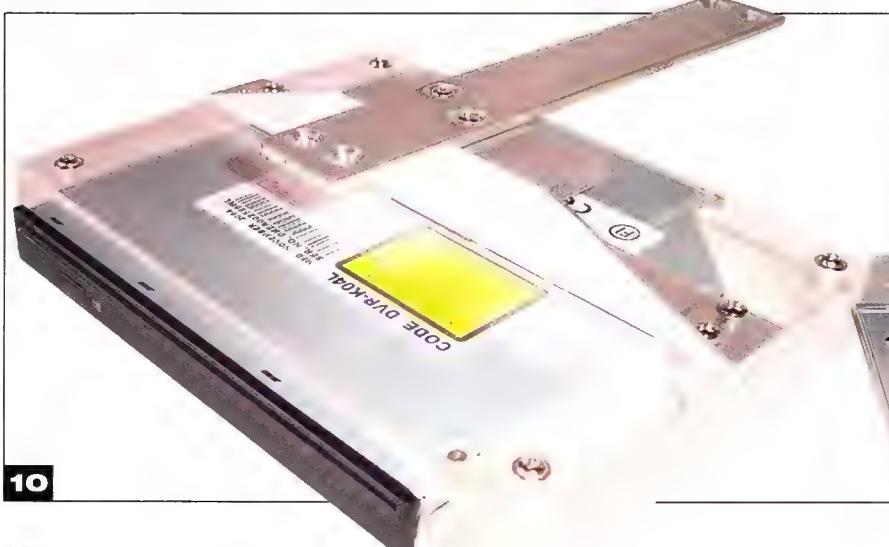
**9** The mounting bracket was fabricated from 20 x 20mm aluminium 'U'-section, with the sides mitred off at 30° for aesthetics, and attached to the drive with four screws. To get the mount located correctly in relation to the bezel, the bracket needs to be clamped roughly into place and then a vernier calliper used to measure and position it centrally across the width, with the front protruding so that it will sit level with the case bezel. Once in the correct position, drill pilot holes and tap and countersink 3mm screws to attach the assembly to the cross-beam. Access is now a simple matter of removing the cross-beam screws and lifting the drive up and back.



**10** This marks the end of Part 1 on the mini PC project case. As it stands, the optical drive is mounted, the case painted and the aluminium sections are ready for polishing. Although the case is looking relatively finished, there is still more to be done, with the outer covers to fabricate, switchgear and cabling to install and then the mounting of the actual PC components. As far as meeting the challenge where size specification is concerned, we have failed miserably so far. The case is 16mm too wide, 6mm too deep, and a whopping 55mm too high and therefore displaces six-litres of airspace, but that still means that it is 5 litres smaller than a Shuttle G5. In defence, the case does have the capability to house a standard PCI card and will have mic-in, two additional features compared to the iMac Mini that we have set out to emulate.

Part 2 will see these areas covered, and hopefully we will be able to come in under the 30W benchmark that has been set.

And then we will have to find a use for it!



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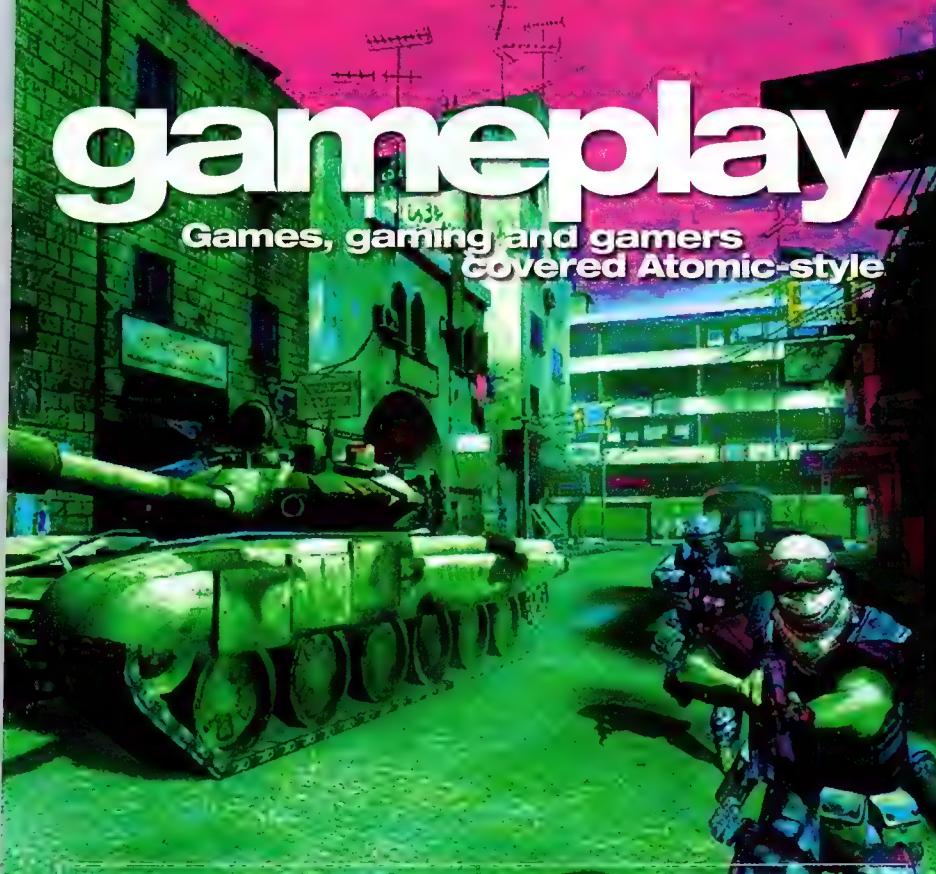
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# gameplay

Games, gaming and gamers  
Covered Atomic-style



Last month's *Atomic* saw me talking about sex in games. It's a topic that only makes it into mainstream media when the shit hits the fan and somehow manages to get misunderstood time and again. What pains me is when mainstream news sources collect facts on 'grown-up' issues, but make stuff up and conduct one-day studies when reporting on video games themselves.

With the exception of people like CNN/Money's Chris Morris, the media simply doesn't give a crap about games, even though companies like EA are cash-conjuring juggernauts. These days the only good source of gaming news comes from bloggers; decent sites like Scott Miller's 'Game Matters' and Julian Cram's (of Ratbag Games here in Oz) 'Sciopolis'. Score one for the little 'J'.

Sensationalist media with their scare tactic reporting, or totally misinformed front page stories on Need for Speed: Underground, Manhunt and Counter-Strike are bloody shameful. It cuts me to the bone to think of parents who read and watch these stories, get the wrong impression, and fail to do a little research themselves. No one should take anything at face value, especially a parent concerned about their children. Any parent who blames NFS-U for their rev-head teenager who drives

dangerously, or Mannix for their gang-leader son, has other issues to deal with. Retroactively blaming an influence they had the power to prevent is silly - it's like saying Ronald McDonald made you fat.

California Assembly member Leland Lee (a man who basically admitted in an interview with GameDAILY BIZ he's never played any of the games I just mentioned) currently leads the fight to clamp down on the sale of adult games to minors in the US, burdening retailers who already follow the rules and making the government not liable. The ESRB's reluctance to assign the Adult's-Only rating, pressure from government and youth groups means that Lee may get his way. Right now his Bill (see Scanner, *Atomic* 54) has hit a roadblock, but with a similar Bill already in effect in Washington State, it has the potential to make it through.

Fear the day when our government takes freedom of expression away from developers, and choice from parents and children. Who needs education when stop-gap legislature and fear-mongering mainstream media dictates what is right and wrong.

Guess Logan's age!  
Hint: Yes, older than 12



## Scanner

Planes, planes and planes! Be a hero of the pacific!



## Culture Shock

Your inside guide into entertainment of the non-gaming kind.



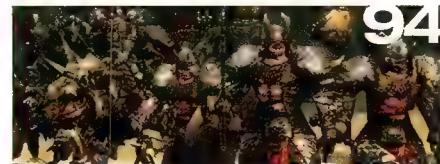
## Fuzzy Logic

It's Mansill. Ben Mansill. He has a lot to say, and he wants you to hear it.



## Pipeline

Exclusive play-through of Ultimate Spiderman. It's webby!



## Engine Room

Fantasy. Fighting. Spell casting. Dungeon Siege 2 has it all.



## Battlefield 2

## Fantastic 4



## Hulk

## Blitzkrieg 2

## short circuits

Feeding the geek need for conventions, Blizzard has announced BlizzCon, a first-ever event tailored specifically to celebrate the company's many games. The event, which will be held on 28 and 29 October, will let avid fans quiz the developers of their favourite titles, including StarCraft, Warcraft and World of Warcraft. The only problem is you'll need to head to California to attend. If you do go, be sure to ask them when the hell Starcraft: Ghost is coming out.

**Those who were blown away** at E3 by Ghost Recon 3 on the Xbox 360 will be happy to learn that the game will see a PC version, to be developed by the somewhat unknown studio GRIN. This is great to hear as it would be a shame for a solid FPS series like Ghost Recon not to make its way to PC simply because the next-gen consoles are almost upon us. Great news for Clancy fans, as well as everyone else.

**Looks like Codemasters** and Bohemia Interactive have parted ways, leaving Bohemia without a name for its Operation Flashpoint sequel. Leave it to those witty Czechs though to come up with an alternative title, in this case the alliterated masterpiece 'Armed Assault'. The game is still very much in development at this point however, and rumour has it that the sequel will have much improved graphics and AI, as sequels do. Keep an eye out for it next year.

'I don't hate Codemasters. I pity the fool.'

# scanner

Industry and online news for the complete gaming enthusiast

## Heroes of the Pacific

**Ben Mansill** is an expert bogey-shooter.



**I**R Gurus is a new Australian developer populated mostly by ex-Melbourne Housers, which as an excellent starting point ensures a rich pedigree of game development talent. IR Gurus' first game, Heroes of the Pacific, is good to go, and we had a chance to visit them recently to have a look at the debut title, which has been picked up by Codemasters.

The Gurus reckons it has a new niche covered, being WWII arcade flight combat. We could instantly tell that, indeed, it was arcade – the blazing guns look like afterburners on a modern jet, but pointed the other way. Beautifully, outrageously huge and fiery. We also had a fly in the alternative sim-mode, and found that to be less than IL2, but much more than Crimson Skies. The game never tries to be a full sim, but thanks largely to historical event based missions, it still feels

realistic enough to satisfy.

It's a multi-platform release, but this doesn't mean the game is a lowest common denominator console compromise. The game pushes the very limits of what a console can handle, and impressively, this translates to what feels like a true cutting-edge PC title.

Expansive draw distances populated by hundreds of simultaneous air units is the big achievement. Around 300 aircraft – each with its own independent AI routine – can be displayed on-screen. Flying, for example, to intercept the Japanese as their planes head towards Pearl Harbour is awe-inspiring and just a little pants-wetting as the horizon fills with enemies, then a moment later you're right in the middle of a deliriously madcap mess of dogfights.

This 'swarm' technology, as IR Gurus have



'The flying and the shooting is all good sir, but I'll be damned if I can land the bastard.'

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atomic

## Gurus reckons it has a new niche covered, being WWII arcade flight combat.

dubbed it, is largely possible through canny management of LoD (Level of Detail) rules. Up close, each plane sports up to 10,000 polygons and looks magnificent. Before it gets that close though, it will have passed through different LOD presets for both graphics and AI. The team originally hoped for upwards of 400 on-screen units – a goal it achieved in its impressive E3 demo, but ultimately scaled back as other areas were being taxed, such as AI, draw distance and variety of plane types. Finding the best balance was largely dictated by the PS2's architecture, being the base platform. However it can truly be said that Heroes of the Pacific is one of the best-looking PS2 games ever released.

During development, the programmers at IR Gurus favoured the Xbox as a platform offering the easiest path to rich graphics, citing the shader flexibility being the key to superior textures and shinier water.

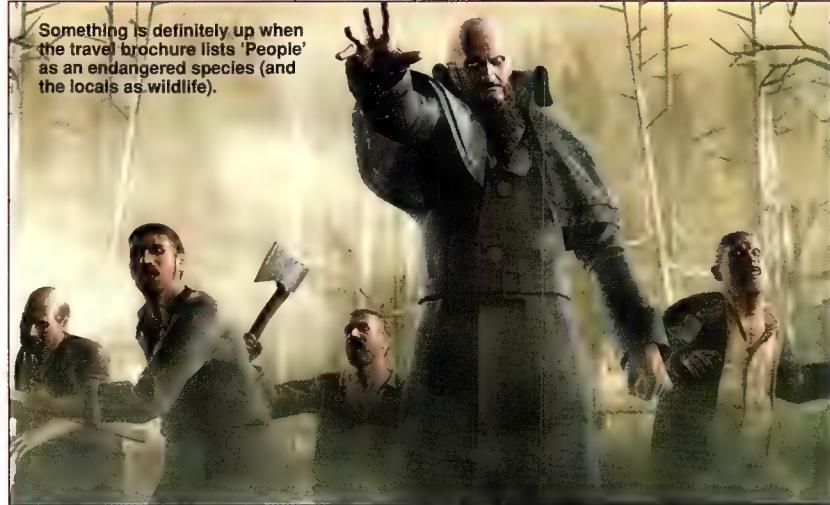
If Heroes of the Pacific takes off, expect additions to what could be a lucrative franchise. Heroes of the Tasman, anyone?

The new X-25 jet plane was based on a radical new reverse engine design.



# geekette

A girl's eye view of the gaming world



**R**ecently someone suggested I play Resident Evil 4. Being the avid zombie fiend that I am, this was not a bad proposal. It certainly shouldn't have provoked the string of expletives that it did – it seems simply mentioning the words 'Resident Evil' was enough to recall the nightmare that was playing its predecessor.

My confidence was shattered right from the start, when negotiating something as simple as a rectangular room with a table in it proved to be a task difficult beyond all comprehension.

I spent hour after horrified hour turning in circles because my mind simply refused to grasp the concept of character-centric movement, as opposed to screen-centric, which I am clearly accustomed to. After an age of frustration, I managed to get my character to walk from the door to the table using a complicated series of about-faces.

It then took a 53-point turn just to get within pick-up range of the typewriter ribbon. I literally had to take a break before undertaking the challenge of turning around again to put it in the typewriter.

I would love to say that my playing got better as it went on, but the truth of the matter is I never actually made it beyond that first section. My efforts of escaping the angry maws of ravenous zombies proved fruitless as once again I spun on the spot like a demented ballerina instead of actually running away. Why didn't I just shoot it? Why indeed. The stupid thing is coming at me with all the grace and speed of a tractor and I'm too busy doing the foxtrot to aim at it properly.

Somewhere between perfecting my pirouette, and getting my throat ripped out for the bazillionth time, my mind quietly snapped in half and I marched the damned game straight down to the trade-in bin of my local games outlet. As much as I love zombies, I don't want to be made to feel brainless because I can't steer my character.

Somehow I managed to repress this original Resident Evil experience long enough to play the fourth installment and surprised myself by having a blast. All they had to do was place the camera behind the character and my world suddenly made sense.

In fact, make me a controller that actually responds to my instinctive thrashing about and I'll be unstoppable!



## critics

## culture

Everything you need to know about  
books, film, music and literature

**War of the Worlds**  
Tom Cruise,  
Dakota Fanning



This movie rendition of H.G. Wells well-known novel really doesn't focus much at all on the original story, and instead indulges in bright death beams and family conflict to meander through its 116 minutes. The scenes are still quite charged however, thanks to the hand of Steven Spielberg, but it's not as good as *Minority Report*. LB



**Deadwing**  
*Porcupine Tree*



Heavy rock with an old school sound that is let down only by its moments of self-indulgence. On the other hand, can you ever have too many guitar solos in the one track? A kickin' drum sound, but the remaining rhythm section is a little weak at times, tending to blend into one noise. Vocally *Deadwing* is awesome, powerful and at times creepy. Possibly not the best example of their work but with lyrical lines such as 'It's easier to talk to my PC' *Deadwing* is well worth the listen.

Notable track(s): **Deadwing** TC



**Saturday Night Lotion**  
*Plump DJs*



With every Plump DJs release, access to an expensive sound system (or decent headphones) is a must to truly appreciate what the boys are trying to achieve. With luscious basslines and synths with a mix of original tracks and remixes, this is an energetic album that will liven up any party. With samples from Missy Elliot (*Get Kinky*) to the Eighties' group Thompson Twins (*Doctor Dub*), this is the perfect album for your next house party.

Notable track(s): **Soul Vibrates** bC

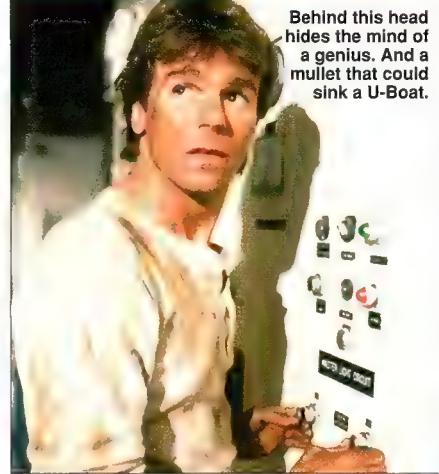


## MacGyver – The Complete First Season

When the pilot first aired back in 1985, *MacGyver* (Richard Dean Anderson) was a breath of fresh air in a decade where everyone was trying to copy everyone else. Instead of guns, MacGyver would use his ingenuity. He didn't do drugs or drink, making Mac the antithesis of almost every 80s TV character. Viewers would look on in utter amazement as our mullet-haired hero would – literally – pull a paperclip from his back pocket and disarm a bomb or use pinecones to de-rail a jeep full of AK-47-wielding hit men.

Now, 20 years on, we have an opportunity to once again enjoy the antics of everyone's favourite scientist/engineer/hero. The original Gordon Freeman.

Paramount has just brought out the first season on DVD, which packs a total of 6 discs' worth of the Mac. Every moment is genius,



Behind this head  
hides the mind of  
a genius. And a  
mullet that could  
sink a U-Boat.

every 'MacGyverism' a classic. With the passing of actor Dana Elcar (who played Pete Thornton) in June this year, this DVD set is a must if only for posterity. LB

Starring: **Richard Dean Anderson, Dana Elcar**  
Director: **Lee David Zlotoff**  
Distributor: **Paramount Pictures**  
Website: [www.paramount.com](http://www.paramount.com)  
Available: **On DVD**



'He can fix anything. He can fix a computer with a hairpin and a piece of duct tape.' – Pete Thornton



Fantastic 4 isn't so fantastic.  
Well, except for Jessica Alba. Mmm... Alba.

## Fantastic 4

*Fantastic 4* is one of those movies where you walk out of the cinema thinking 'You know, it wasn't so bad,' only to realise once cosily at home with a copy of *X2* that it really was just a Marvel-branded turd.

*Fantastic 4* is the movie version of the comic with the same name, and follows the story of four characters – Reed Richards, Susan Storm, Johnny Storm and Ben Grimm. Affected by a cosmic storm that alters their DNA and provides them with special powers, the four seek a cure for their condition while coming to terms with the impact it has on their lives. Also in the mix is the suspicious Victor Von Doom, also affected by the storm, but whose motives and desires border on the dark.

The direction of the movie is not immediately obvious and, unfortunately, never really makes itself known. At some points it is a story about family, at others, a tale of beauty and the beast. *Fantastic 4* takes an age to develop and, by the time it does, it's all over, the stage elaborately set for a sequel that no one wants to see.

Its redeeming features? Just one: Jessica Alba – and not for her acting.

LB

Starring: **Ioan Gruffudd, Jessica Alba**  
Director: **Tim Story**  
Distributor: **Twentieth Century Fox**  
Website: [www.foxmovies.com](http://www.foxmovies.com)  
Available: **Cinemax**



'It's clobberin' time.' – Ben Grimm, aka The Thing.



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# fuzzy

A Ben's eye view on the crazy world of tech and entertainment

## Return to Far Cry island

**Ben Mansill** gets lost in the Bahamas with a coconut, a Beretta and a shark called 'Timmy'.

I've just found an excuse to play Far Cry again! Hooray! It didn't come easy, it was an expensive and indirect path to get to the excuse, but I made it! Having played Far Cry through four times now (a personal best for any FPS), I really needed a proper justification or I'd just feel like a loser. Well, more of a loser.

Holy justification came in the form of a fairly massive system upgrade. Double-hooray! After running a paltry P4 2.2GHz (@ 2.64GHz that idled at a toasty 57°) system for much of the last year, the call of the Athlon became unbearable. The tasty-tasty Venice core gave me the final impetus, and it's 3800+ ahoy! Picked up a nice new ABIT AN8 SLI mobo, marvelled at the funky Northbridge heatpipe running all the way across the board, and shoved some Corsair in there. Ta-rah – I'm cooking with volcanic fury.

The building adventure wasn't completely without incident. These things never are. After assembling all the bits I hit the power. But not before standing back, breathing deeply and *appreciating* the enormous power which was about to spring into life. These are momentous moments. Hitting the power button for the first time has the same life-giving gravity as cutting your child's umbilical cord. Sort of.

Think of the ape in *2001* gingerly reaching out to touch the obelisk. It wasn't like that at all. 'Go you good thing!' I shouted, in my mind, and punched the button.

Nothing. Which I half-expected. These things happen. There are perils inherent with building a system. A process of jiggling, inspecting, quadruple-checking and hoping ensued. This time! Power. Nothing. Bitch.

By 4am I'd concluded it was a DOA PSU. Couldn't be anything else. Unless that anything else happened to be the connector for the USB ports, which I'd – let's use the word 'inadvertently' – plugged in backwards. ABIT, bless its cotton socks, won't let the system boot if earth ain't earth, and

earthed it wasn't with the little 3-pin doobie plugged into the mobo header the wrong way around. For all I know all mobo companies follow this astute practice. I wouldn't know, having done it right every other time. Lesson learned, right there. Noted to self at the time: build a bridge and get on with it, try to still enjoy powering up for the first time, promise to tell nobody of self's foolish ineptitude and thank the stars nothing else went wrong. And, benchtest the sucker!

Which, in a roundabout way, is how I came to be installing Far Cry. Watching passively as a synthetic benchmark runs, then marvelling emotionlessly at the (hopefully) big number at the end is dull. Admit it. Whereas paddock-thrashing a buggy that's got a .50cal on the roof across the lush vegetation of Far Cry island is friggen fruggen fantastic. Yeeeep. I love Far Cry island! Sometimes I just stand on the beach listening to the bump-mapped waves lapping against the anisotropically-filtered sand, while watching the birds of paradise swoop and the little fishies schooling around. \*Sigh\*. Other times I'll find ways to do a level that I'm positive nobody has ever tried before. You can do that in Far Cry.

Now, even I know that's all a pretty weak attempt to justify loading an 'old' game I've played to death, so while grabbing the patches I find a gen-u-ine real and proper cause to get into it again. The K-9 TC should be anyone's excuse to spend more time in Far Cry world. The fella who made it has created new textures for just about everything and it's lush. Super lush. Ridiculously over the top lush, in a world that was already festooned with lushery. It is just the ticket for marvelling at truly beautiful game graphics, and that, my friends, is what we all love to do, and we don't need an excuse to do it.

Do you think Ben would make a good pirate? Email him now!  
[ben@atomicmpc.com.au](mailto:ben@atomicmpc.com.au)



**Hitting the power button for the first time has the same life-giving gravity as cutting your child's umbilical cord. Sort of.**

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## Ultimate Spiderman

**Y**ep, you read right. Activision was kind enough to let *Atomic* have the first play of Treyarch's comic-to-game *tour de force*.

Anyone who's played previous Spiderman games of recent times will be straight-away familiar with the control system of this new title. What you won't recognise though is the totally revamped graphics engine that makes use of what Activision/Treyarch calls '3D Comic Inking'. The effect it creates has to be seen to be believed, and parts of each mission are broken up with comic book sequences that are nothing short of beautiful.

Gameplay is similar to Spiderman 2, where the player must make use of their web slingers to traverse the cityscape. The system even in the early preview was excellently implemented, and managed to hide our amateurish sling-and-swing abilities.

The game is built around a standard mission structure, where you need to complete objectives within a time limit. Most of play has you saving civilians from horrible deaths as bad guys including Electro and Rhino go totally berserk.

One section of the preview we played had Spiderman swinging across the cityscape chasing the infamous Beetle. Beetle was more than happy to smash through buildings, torching the highest levels of skyscrapers and leaving people to meet their makers prematurely. So, in addition to keeping up with the speedy antics of the Beetle, you have to handle each dangerous situation he causes.

Then, of course, there's Venom, which you get to play as. Now Venom is a mean bastard. His health slowly depletes over time and in order to keep it at a decent level, and to heal in general, you need to feed on civilians and enemies. This feed ability also works to devastating effect against bosses, as long as you have the co-ordination and reflexes of a puma.

Venom can also climb buildings, except he uses his unbelievably high jumps to get to places. He also comes equipped with a vicious arsenal of attacks, including a tentacle whip and the strength to chuck cars many hundreds of metres in any direction you care to throw them. Throughout the game, you'll swap between Venom and Spiderman, which helps keep the game fresh and interesting through-out. Keep in mind that all this action occurs in what is simply the slickest cel-shading seen to date.

The verdict? It's the ultimate Spiderman.

Platform All Developer Treyarch  
Website [www.ultimatespidermangame.com](http://www.ultimatespidermangame.com)





## GUN

**P**eople must be getting sick of Tony Hawk. We are. There's really not much you can do with a dude and a skateboard, so the idea of releasing a refreshed title that's pretty much the same game with improved graphics and a few extra moves is dull as – especially for the developer stuck making them.

So it's a nice change for Neversoft to be working on its first non-skateboard-related game (apart from – coincidentally – Spiderman) in some time. And that game is simply called GUN.

Not much is really known about GUN at the moment, except that it's a first-person shooter set in that crazy, dusty place sometimes referred to as 'The Wild West'. The screenshots show that it's not a bad-looking game, considering it's getting a dual release on PS2 and Xbox. It's a good thing the 360 and the PS3 are close to launch because these suckers are really starting to show their age.

As for GUN, well, right now it's all just hype, hype and more hype – as is wont to happen with a game that a developer doesn't talk about. At all. Just look a Duke Nukem Forever.

If it's anything like Outlaws, then it just might be OK.

Platform **Xbox/PS2**  
Developer **Neversoft**  
Website [www.neversoft.com](http://www.neversoft.com)



## Shattered Union

**I**s turn-based gaming making a comeback? Not really.

The only notable game of its type to come out in recent years is Civilization 3, and, as much as we love that old chipper Sid Meier, Civ 3 really only caters to the elite virtual strategist who has a ridiculous number of man years to blow on building imaginary global empires.

Shattered Union wants to change all that. Take the graphics of Generals and mix it together with turn-based strategy elements and you have SU. PopTop Software, the guys who did Tropico and Railroad Tycoon 2 and 3, are responsible for this intriguing fusion of modern and musty. Set in the near future where the US has broken into warring factions, it's up to the player to unify the once great nation using kilos of depleted uranium and high-yield fuel-air munitions.

Like any good strategy, the player gets to pick and choose where they attack and each area you conquer contributes to your war efforts. Among your resources is Reputation, which plays a large role in your relationships with other countries, as well as determining what weapons you get access to.

Platform **PC/Xbox/PS2**  
Developer **PopTop Software**  
Website [www.poptop.com](http://www.poptop.com)



## Dead or Alive 4

**G**amers will forever hunger for the thrill of watching a pair of semi-naked female fighters beat the crap out of each other (or semi-naked male fighters, because they can be good for the ladies), and Dead or Alive 4 is proof of this fact.

With three additional fighters over the third installment, much improved graphics thanks to the power of the Xbox 360, and an altered gameplay focus to afford newcomers a chance against pros, DoA 4 is very much doing its part to keep the beat-'em-up alive. With the recent mashing of SNK and Streetfighter to create sub-par monkey-grabbers to choke what's left of the genre into submission, we can't think of a better title for the Xbox 360 to launch with. Add to this the chance for a spectator capability of Xbox Live! And you have yourselves one awesome looking title. And, of course, the standout feature of the original game – realistically modelled chesticles – will be there as well. Bliss on a disc.

Platform **Xbox 360**  
Developer **Team Ninja**  
Website **N/A**



## Resident Evil 5

**Z**ombies make the world go round... in gaming at least. While Resident Evil 4 on the 'Cube was more than filling enough last year (and the PS2 port almost with us this year), it's about time Resident Evil 5 reared its decomposing head to keep us on our toes.

All we have at the moment are a few screenshots, but RE 5 already looks like it'll be leveraging the power of the PlayStation 3's Cell processors to make the game the best yet in the series. If RE 4 and Haunting Ground (Capcom's 'alternative' survival horror title) are anything to go by, RE 5 should be full of effects as pretty and realistic as they are surreal and creepy.

Perhaps the most refreshing change is that the game is set somewhere other than a spooky city or mansion, with the screenshots depicting a small rural town in the middle of a desert wasteland.

Hopefully Capcom will work on the success of Resident Evil 4 to make the next iteration just as entertaining and memorable. And, after seeing what it did with the aging GameCube hardware, we can hardly wait to sink our teeth into this one.

Platform **PS3**  
Developer **Capcom**  
Website **www.residentevil.com**



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# Under Siege

**Logan Booker puts his sword and sorcery to the test with Gas Powered Games' Kevin Lambert and Sarah Boulian**

With the demise of adventure gaming years ago, it's amazing that role-playing is still going as strong as it is. As gamers turn to more action-oriented titles for instant gratification, it's becoming progressively harder for games that do have a learning curve longer than a minute to do well in the big bad world of video entertainment. Hence, developers have started looking back at their roots for inspiration. The remake of Sid Meier's Pirates! and the recent announcement of Supreme Commander, the sequel to Total Annihilation, by the Chris Taylor-fronted Gas Powered Games, shows that sometimes the best way to move forward is to start by looking back.

GPG didn't spark its blast to the past with Supreme Commander though. In fact, the company is set to bring back everything that was great about computer role-playing – adventure, excitement and proper co-operative gaming – with the sequel to Dungeon Siege.

## What's cooking?

Dungeon Siege 2 has been in development for almost 3 years and includes everything we

learned about RPGs since the original Dungeon Siege,' says lead designer Kevin Lambert and lead level designer Sarah Boulian.

'We have made some huge improvements in the engine and rendering technology, but also the game really emphasises the storytelling and character development systems.'

Dungeon Siege was an interesting take on the RPG landscape when it came out back in 2002. Instead of forcing the character into a role from the get-go, DS allowed the player to get a feel for the game world and its mechanics before making a choice. They could then improve their character by using certain abilities – sword fighting to increase melee, or throwing around spells to improve their casting powers – eventually shaping the character into a true representation of the player's play style. If there was anything wrong with the original, it was that it was a little *too* freeform and lacked solid direction, thanks to its obsession with boundless flexibility.

'We definitely wanted to keep the original game's character development mechanic of "you are what you do" – if you want to be a

fighter, put a sword in your hand. If you decide you want to be a mage, start casting spells,' says Lambert.

'Characters can develop in melee, ranged, nature magic and combat magic classes – this mechanic is different from most other RPGs. DS2 enhances this mechanism with skill trees within each class that allow characters to specialise in one or more "roles" within each class (such as a fighter who can be a dual-wield specialist or a two-handed weapon specialist).

GPG also promises, along with the retained gameplay, a more cohesive game story and involving quests. 'We've definitely paid close attention to the connection between the gameplay and the story. Through the use of the primary quests, the main storyline should prove to be extremely focused while still offering enough freedom for players to pursue optional areas and side quests if they desire,' says Boulian.

Of course, while GPG has worked hard to retain much that was good from the first game they weren't going to leave them unweakened.

'The core features of the game – and what



If anything is certain, it's that Dungeon Siege 2 looks a might more graphically impressive than its predecessor. Players will orgasm at the sight of spells, combat and semi-naked characters with more curves than the Udderholm Swedish Rally.



# DUNGEON SIEGE II

I think the team is most proud of – would have to be the improved combat system that focuses on a single hero and keeps the player engaged with special powers; the deeper character development with skill trees and pets; an improved story and quest system; and much better loot!" explains Lambert.

## Party time

One of the exciting prospects of the original Dungeon Siege was its multiplayer. DS promised a fulfilling co-operative gaming experience, as well as a solid single player game with a computer-controlled party. Each member could be assigned orders, allowing for a great deal of freedom in tactics during combat.

In reality, much of the game's highlights got lost in the playing, something that GPG was very aware of when making the sequel.



Enemies will tremble in fear at the mere sight of your all-powerful arms and armour. Above, Maddox slays a yellow-glowing, scaled abomination with no job and a speech impediment. How quaint.





See, what did we say! Curves in their hundreds! If that isn't enough visual lusciousness, then feel free to call down giant moonbeams to blast your opponents, or swirling whirlwinds of flaming magic death to crispify them. You know, whatever burns your loins.

'The single player mode and story were among the team's main areas of focus... Players will find 40+ hours of gameplay in the single player mode and that's just in Mercenary difficulty,' explains Lambert.

'Replaying the game on Veteran and Elite difficulty – which become unlocked when you complete the game in Mercenary and Veteran respectively – offer an additional 40+ hours each.'

'DS2's multiplayer can be played online or on a private LAN with up to 4 players and up to 3 party members each,' he says.

And it is in co-operative play that much of a true RPG's fun lies, and this holds true with DS2. There's a reason why the father of the modern RPG, Dungeons & Dragons, was an innately social game. Due mainly to time pressures most CRPGs go against this, limiting themselves to an entirely unsocial experience. While there is much to be said for single player role-playing games, it seems a waste to not share a world full of characters and history with

many people simultaneously.

'Cooperative play through the main storyline is the primary focus of DS2's multiplayer modes. Many of the powers are designed to work well when combined with another and this is especially evident in multiplayer,' Boulian assures.

According to Boulian, the DS universe is one with a lush, detailed history, a history that dates many thousands of years. Taking this and blending it with the gameplay of DS2 was a top priority. As a result, the world of Aranna, in which the game is set, lends itself to an epic quality.

'While building levels, we considered a number of story factors, including where in the continent of Aranna each area exists, who lived there in the past, what major events had taken place there, and what bits of the past would still be present,' says Boulian.

'Much of DS2 takes place in areas where civilisation has been present for thousands

of years, and the ruins of ancient structures lie scattered about the landscape. This sort of design depth can, in fact, affect the gameplay, bringing the world alive with more realism and believability.'

## Dungeon building 101

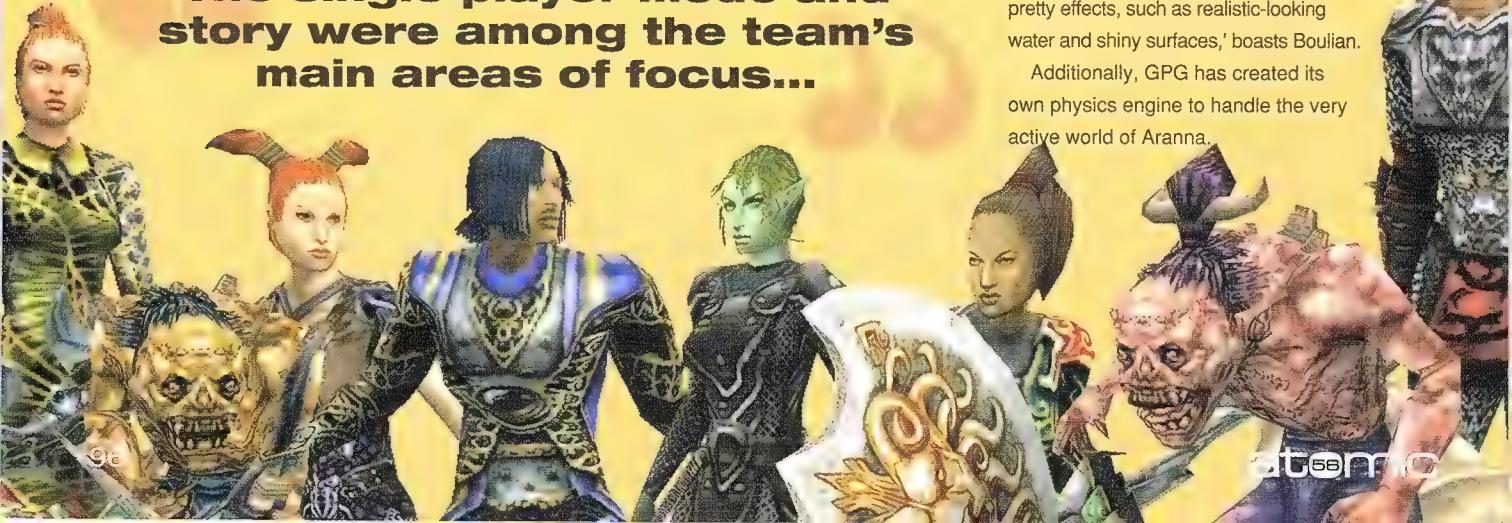
In light of advances in both graphics grunt and processing power since 2002, the Dungeon Siege engine has undergone some changes to bring it up to spec with today's powerful and feature-filled hardware. Although the engine is designed for PC only, GPG has not squandered the flexibility the platform provides, as Lambert explains.

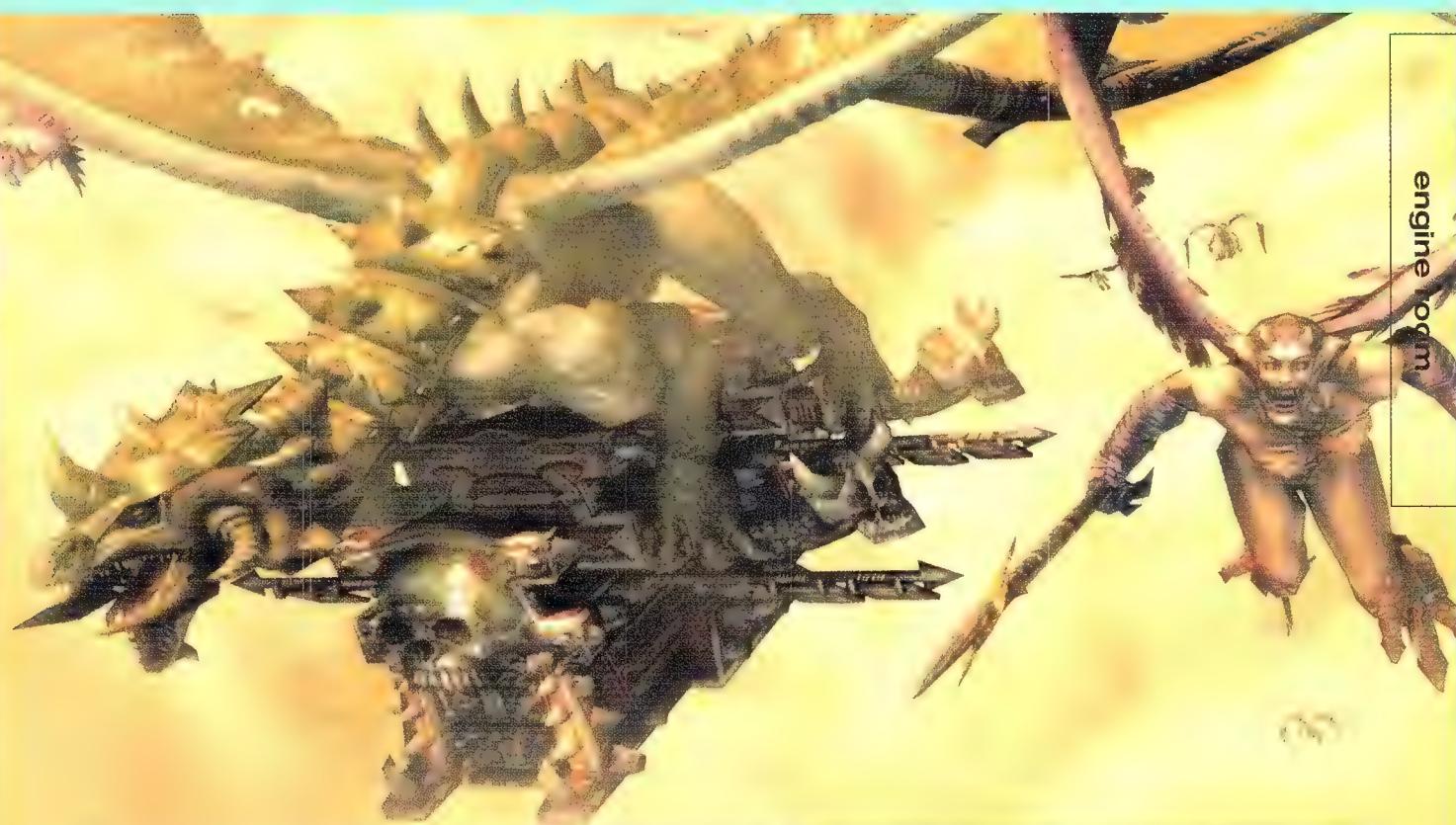
'The game takes advantage of the latest hardware through things like DirectX shaders 2.0 and an all-new effects engine. We've also been able to raise the minimum spec which allows us to have more detailed scenes and characters,' he says.

'We updated the Siege Engine to use DirectX 9.0 and support shaders 2.0. If you have a compatible graphics card, you can enable advanced shaders and enjoy a wide array of pretty effects, such as realistic-looking water and shiny surfaces,' boasts Boulian.

Additionally, GPG has created its own physics engine to handle the very active world of Aranna.

**The single player mode and story were among the team's main areas of focus...**





Finally, the engine was given an overhaul to improve the AI. While this was one of the defining features of the original, GPG felt the need to outdo themselves to make DS2 that more easier and enjoyable to play, with great results.

One area that received particular focus was the aggro management system, which handles how enemies react to certain players and their abilities.

'Many enemies in DS2 have "hatreds" and will attack characters based on different criteria. For example, some enemies hate healers and will attack any character they see using a heal spell. Other enemies hate people who use powers or take treasure,' says Lambert.

'With the parties, their AIs can be controlled with a single button press, to set their standing orders.' Parties can also contain pets – and not just defenseless pack mules. Creatures will join you that can fight and grant special abilities, and will develop depending on the items you feed them.

## Into the light

Currently, Dungeon Siege 2 is all set for an August release date, with the final release candidate undergoing testing at the time of writing. With a massive world to explore, a totally free-form character development system, a revamped engine and an intelligent party and creature AI system, Dungeon Siege 2 should make for an excellent RPG to satiate the adventure-hungry. Who said co-op was dead?

## Kickin' with co-op

The explosion of massively multiplayer online games has shown that people love playing co-operatively. The first time you round up a bunch of mates in an RPG and combine your talents and personalities to quest and explore really is a defining moment in a gamer's career. Surprisingly, co-op for the most part is neglected by developers, who focus usually on killer single-player or mad deathmatch. It's easy to think of team deathmatch as 'co-op' – but it's not. True co-op gaming involves man against machine, where humans outwit and outplay computer opponents.

What's worse than a lack of co-op is poorly implemented co-op. Developers can be put off by the complications that arise when trying to convert a single-player experience into a co-op one – which isn't the way it should be done. Co-op games need to be built from the ground up as co-op games.

And don't think there isn't a demand for it. Remember when Doom 3 came out and all everyone could say (apart from the whole flashlight thing) was 'Where's the co-op?' id finally bowed down to player demand and stuck co-op into the Xbox version, which satiated console gamers. It still left their PC brethren wanting however.

That's why it's great to see a game like

Dungeon Siege 2 where the developer has taken the approach of 'co-op first'. Because of this, you can be guaranteed that every moment in the game has been crafted to suit the co-op experience, and that having a friend join in adds, rather than complicates, the fun.





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To think Battlefield began with Codename Eagle, a game that according to the DiCE website, sold 250,000 copies worldwide. Not bad considering it was a title made by a foreign developer in 1999. Looking back at Codename Eagle, and Battlefield, one can deduce that multiplayer first-person shooters are more than just a genre for the Swedish game studio – they are an obsession.

While Codename Eagle has been and gone, people still play Battlefield: 1942. The funny thing is, it's not plain BF1942 that people play, and it's not the reason they're still playing it. BF1942 has a mod called Desert Combat to thank for that. Much like Half-Life and Counter-Strike, the game was eclipsed by a community-created modification, leaving it, and an official expansion, to hibernate.

So, what did DiCE and EA decide to do? Why, create a sequel that's almost identical in every way to Desert Combat! Apart from a mighty fine engine tune, an official ranking system, and a squad system, nothing much is new. This doesn't mean it's a bad game – just an uninspired one.

The premise of the Battlefield series is objective-based team multiplayer. Players log onto online servers and compete to hold points, invade enemy bases and kill one another. The duration of each match is decided using tickets – as players die, they use up a team ticket from a pool of (usually) 200. Holding over half the points on a map causes tickets to deplete at a steady rate. This wonderful mechanic helps to get players working as a team, rather than going solo, and it works for the most part.

Vehicular combat in the form of jeeps, tanks, planes and choppers is also present, but most vehicles require multiple occupants – one driving, one gunning, etc – to make the most of them. Unlike Battlefield: 1942, BF2 is set in the modern day, giving the

player access to many of today's weapons and allowing hordes of teenage kids to slaughter foreigners in their thousands with them.

What is sad is that none of these game mechanics have changed at all. To add insult to injury, BF2 has only a small selection of maps (about 10) and a single game mode (Conflict).

What the hell?

One thinks the developers got too caught up overhauling the graphics engine. Dynamic lighting and shadows, pixel shaders galore, and excellent sound effects and animations do much to cover what is quite obvious once you play the game for any appreciable amount of time.

Don't expect to enjoy any of these graphical improvements however, unless you're running a machine crafted by Zeus' IT guy out of raw lightning bolts and ambrosia. Without a 6800 Ultra or X800, 2GB RAM and a Athlon 64 4000+, you'll be turning the graphics settings down to Medium and Low just so you don't get creamed online.

On the upside, much has gone into making



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Command your troops with a screen similar to this one, or even exactly like this one.

the netcode efficient, and apart from the odd stop-start, gameplay is pretty smooth on an ADSL connection. The commander role allows for a controlled and co-ordinated gaming experience, as long as the person in the role is up to it, and the players actually listen to his commands. The commander can issue orders to squads, fire artillery and easily see the progress of battle. Like Tribes and Natural Selection, this adds another enjoyable facet to the game – if used correctly.

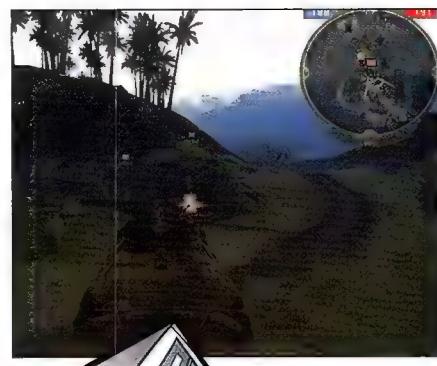
When you join a battle you can select from a variety of defensive, offensive and specialised classes. Medics and Engineers will keep your troops and vehicles moving; Support (heavy machinegun), Assault and Special Forces act as grunt; and Anti-Tank troops and

Snipers provide unique combat options.

Medics are perhaps the most interesting, able to bring dead units back to life to keep the flow of battle going.

There is no doubt Battlefield 2 will be a popular game, thanks to Desert Combat. Newcomers will be overjoyed by the graphics and gameplay, but those moving from the original or DC will be disappointed to find nothing much has changed. Regardless, people will make the move anyway simply because they can.

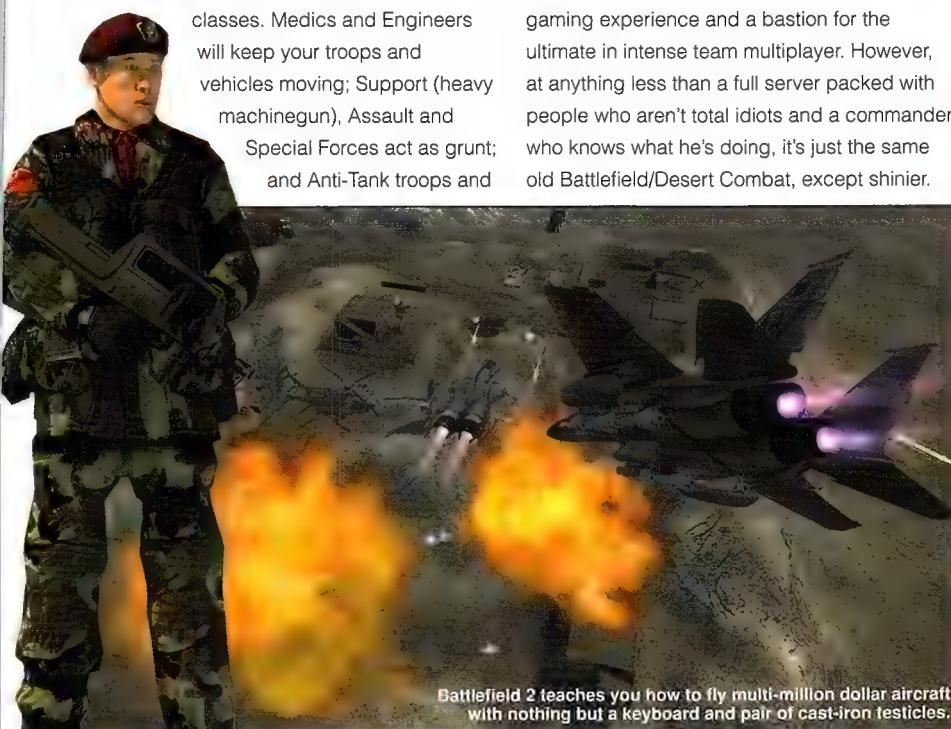
At its best, Battlefield 2 is an awesome gaming experience and a bastion for the ultimate in intense team multiplayer. However, at anything less than a full server packed with people who aren't total idiots and a commander who knows what he's doing, it's just the same old Battlefield/Desert Combat, except shinier.



**PC**

Digital Illusion CD  
global.dice.se

Athlon 64 3500+  
or P4 3.2GHz; 1.5GB RAM; 6800  
(ForceWare 77.30) or X850.



**VERDICT**

Gorgeous looking game; squad system; commander mode; frenetic combat.

Feels unstable; lacks polish in the details and is a ravenous resource hog.

**8.0 OUT OF 10**





**XBOX**

**Seven Studios**  
[www.f4thegame.com](http://www.f4thegame.com)

**2**  
**PS2/GC/PC/GBA**

Holy flaming fireballs Batman, it's a load of crap!

# Fantastic 4

Ron Osborn thinks the name 'Fantastic' is a bit of a stretch.

Much like a good action movie, a good action game relies on impressive visual effects and plenty of, well, action. A Marvel superhero game is an adequate excuse for copious amount of both, but Fantastic 4 just manages to fall short of these expectations.

Based on the movie of the same name, Fantastic 4 puts you in control of the superheroes: The Human Torch, The Invisible Woman, The Thing and Mr. Fantastic whose stretch ability doesn't exactly justify his name.

Rather than choosing a single character with which to pummel through wave after wave of enemies, in Fantastic 4 you can pummel through wave after wave of enemies with all four heroes, switching between them via the controller D-pad.

When not under your control, your counterparts are smart enough to keep on kicking but if you want some real help there's always the game's two player co-op mode.

Though the action element is certainly there, it's in the visual department that Fantastic 4 loosens out. Perhaps it's a sign of a multi-platform, lowest-common-denominator design, but the blocky graphics hardly do the Xbox justice and combat effects just don't pack much of a visual punch. Backing into a wall also tends to create some less than flattering camera angles, and though the view can be easily moved, it's a pain particularly during intense button-mashing fights.



Combat is about standard for a 3D beat-em-up action game. Each character has their own special abilities, with more to unlock as you progress through the game. Team combo maneuvers add some variety to the game play and destructible environments keep things interesting, particularly when playing as The Thing. Though the levels are short, this actually helps the pace of the game and provides a good mix of action and story.

Though the game is based on the movie, it also has an original storyline co-written by Zak Penn (who's superhero movie co-writing credentials include *Electra* and *X-Men 2*). The attention to the story helps drive the game, though the sporadic rendered video sequences are reminiscent of early 90's 'multimedia' CD-ROMs. The story isn't the only part of the game to get the Hollywood treatment, the in-game dialogue has been voiced by the cast of the movie and character theme songs

have been contributed by the groups: Taking Back Sunday, Jurassic 5, The Explosion and Go Betty Go.

While this kind of tie-in is a good use of the movie licence, unfortunately the theme songs leave a lot to be desired and are thankfully tucked away as extras.

While the team element adds to the gameplay and the story is well told, these factors just aren't enough to lift Fantastic 4 above the other beat-em-up games out there.

## VERDICT



Well-told story; interesting team-based elements; dialogue by movie cast.



Average graphics; lacks the punch of other action titles.

SOONG

**6.0**  
OUT OF 10



## The Incredible Hulk: Ultimate Destruction

**Ron Osborn gets too big for his pants.**

Action games seldom need much of a premise for big explosions and wanton destruction, and the latest Hulk game wears the action badge proudly on its sleeve.

With no impending movie to ride on the back of, it's encouraging to see that developer Radical Entertainment has put the emphasis on a fun gaming experience rather than trying to exploit a loose movie tie in – ahem, *Fantastic 4* anyone?

As the name implies, the emphasis is on destruction and Hulk: UD doesn't disappoint. Just about everything in the environment is capable of being crushed, wielded or thrown. Explosions are satisfyingly meaty and cars burst into flames at the mere sight of the big guy's tightly stretched pants.

The game borrows heavily from the GTA series – from the freeform, choose-a-mission style gameplay to the threat alert system that deploys more aggressive military hardware as the hulk becomes more rowdy.

The GTA imitation is a refreshing change from the typical level by level beat-em-up progression which normally accompanies console action games. Once you tire of running up the side of buildings and throwing burning debris at screaming civilians in freeform mode, you can either progress

through the sequential story missions or indulge in some point scoring, challenge missions.

Challenge missions present you with a variety of obscure yet fun tasks such as seeing how far you can travel without touching the ground, or how many cars you can stack atop one of the tallest buildings in the city. Though they're fun, the reward is the same every time – extra Smash Points to spend on ability upgrades – which decreases the incentive to complete them all.

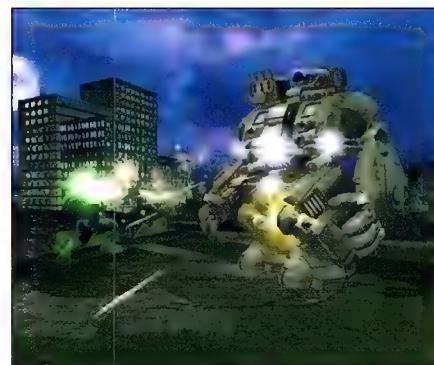
Story missions are straight forward and generally require you to perform some objective while a Panzer division tries to ram Hulk with a plethora of projectiles. As you progress you learn of Bruce Banner's attempts to pacify his inner Hulk, though seeing as you never actually control Bruce, it's hard to give a damn about whatever he's having a cry about.

The only problems with the game occur when your objective isn't to break everything in sight. As in most action games, precision jumping isn't exactly easy and sometimes coordinating camera control can make things a bit haphazard.

Thankfully, the Hulk isn't exactly a precision fellow, so this isn't really that serious a problem.

Repetition though is a problem, as it is with almost all action games. The challenge missions add some variety but once you've tired of running around breaking things there's not a lot left.

If you were disappointed by Hulk's first Xbox outing, this is a vast improvement. It's a car-stomping, civilian-screaming good time – just don't expect it to last forever.



XBOX

Radical Entertainment  
[www.hulkgames.com](http://www.hulkgames.com)

PS2; GameCube

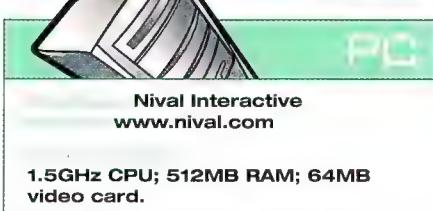
### VERDICT

GTA-inspired gameplay;  
Run rampant with the big green guy.

No incentive to complete all the missions; takes little time to become repetitive.



Score: 7.0 OUT OF 10



Tanks can have their treads destroyed by errant grenades, making infantry at least a tiny bit effective against armour.

# Blitzkrieg 2

**Logan Booker puts his Panzer first.**

Realtime strategy is experiencing a bit of a dry spell, with developers entranced by the charms of the first-person shooter and MMO. Not that you can blame them – any hopes of breaking into the multiplayer market with an RTS are almost zero, with Warcraft 3 and C&C Generals firmly secured in the top spot, with the only real contender being Relic's Dawn of War.

So, now is the time for the nurturing of campaigns and game mechanics to help potential RTS games stand above the crowd.

This is the direction Nival has taken with Blitzkrieg 2, a WW2 strategy title that lets the player command the forces of the US, Germany or the USSR. Although the game features a capable multiplayer component, it's in the single player that the most fun lies. This is thanks to some streamlined, yet complex, game mechanics.

Instead of relying on a base-building system, Blitzkrieg 2 lets you call in reinforcements. Depending on your rank, which increases as you play and the missions you complete, different units become available. Capturing buildings of importance allows you to call in various forms of support, so, taking an airfield for example gives access to scout planes and bombers.

Looking deeper, Blitzkrieg 2 is a game about options. Engineers can dig trenches, plant/disarm mines and construct obstacles for enemy troops. Most units can dig themselves in to increase their defence rating, as well as go into 'ambush' mode, which provides attack bonuses if they spot the enemy first. Hard units such as tanks even

have varying armour thicknesses on each side, so flanking maneuvers provide more than just the element of surprise. This means that a smaller force can potentially win the day if it plays its cards right, taking advantage of trenches to protect infantry and the ambush mechanics to drill an enemy before it can retaliate.

Only a few things let the game down. Translation of the game's text can be dodgy at times – most noticeably during the tutorial missions. From time to time, infantry (usually controlling artillery pieces) will move erratically and, while there's a variety of stances and orders to be given, the lack of a simple 'hold ground' command is a huge oversight, one that will have your units chasing enemies across the map, usually into awaiting hordes, unless you pay diligent attention to them.

Otherwise, Blitzkrieg 2 is a nice blend of the depth of Sudden Strike with the playability of Command and Conquer, if you can deal with the lack of polish. Recommended if you're dying for a good bit of strategy fun.



## VERDICT



Good graphics on low-end spec; plenty of strategy; unit promotions; reinforcements.



AI can be problematic; some dodgy translations; animations can be erratic.

**Score**

**7.5**  
OUT OF 10





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## Settling hash

I was reading through the X-Ray in the June issue of *Atomic*, and have a question regarding the use of MD5 in integrity checking with games. Why couldn't games run a check each time you started the game to find out if the game is illegally patched with No CDs hacks and the like?

Sam

**G** First up, it's highly questionable whether no-CD patches are, themselves, in any way illegal. Laws like the US Digital Millennium Copyright Act make it expressly and criminally illegal (as opposed to a mere breach of contract, which is a civil matter) to circumvent copy control technology, no matter how lame that technology is ([tinyurl.com/AWV65](http://tinyurl.com/AWV65)), and even if you're only doing it so you can do something else that's perfectly legal. Like, for instance, run the game you bought on your sub-notebook when you've swapped out the CD-ROM drive for a spare battery.

Australia can expect to enjoy DMCA-like laws as well, as part of our recent Free Trade Agreement with the USA, but that doesn't mean they'll stand up in court. Such laws, and various provisions of End User License Agreements, can prohibit all sorts of things that may in fact be found by the courts to be perfectly fine. Or the laws may simply not be enforced. Remember in Australia it's technically illegal to record most TV shows with a VCR. The jails aren't exactly packed with offenders, though.

Getting to your actual question – yes, hash functions of various kinds have been used by game makers to stop people patching the games. This isn't just a copy-control issue; verifying that the game files haven't been changed is also a good way to slow down cheaters.

Simple MD5 authentication, though, doesn't

work very well. Even if you ask for an MD5 hash of some randomly chosen portion of some randomly chosen file every five minutes, all a patched game executable has to do is keep copies of all of the original files, and run the hashing algorithm on those.

Here are a couple of good places to start reading about the continuing arms race between cheaters and decent upstanding folk: [tinyurl.com/BEHKM](http://tinyurl.com/BEHKM), [tinyurl.com/9H8X6](http://tinyurl.com/9H8X6)

## D-shaped plug, cross-shaped hole...

I recently got a new laptop – an Acer Ferrari 3400. Nice piece of kit, cheap, but rather fast (if a little hot). I also got from work a new Sun 19-inch LCD flat panel display (I believe they're actually made by Samsung). This has two inputs – standard VGA, and DVI-D.

Now here is the problem – the ATI RADEON MOBILITY 9700 on this laptop has only VGA-out. Of course that connects to the LCD screen with no problem, but I'd really like to make use of the DVI part.

Having done a little research, I understand that there are three types of DVI connector – DVI-A, DVI-D and DVI-I, where by A is an analogue input, D is digital, and I is integrated, supporting both A and D. I've also seen that you can buy dongles that will convert a VGA D-Sub interface to DVI. But I suspect that wouldn't work in my case, as the analogue signal needs to be converted to digital ADC'd.

## IOOTM wins a Logitech MX518!

**M**eetees, is there anything they can't do? Gaze upon this pinnacle of mouse gorgousness!



I've seen convertors around the web that sort of do this, but they're expensive and seem to be more aimed at projection requirements.

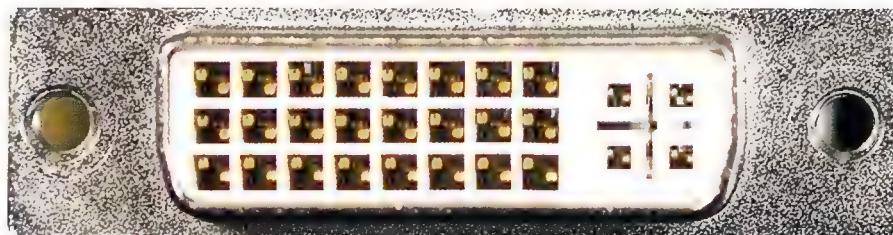
Will a simple conversion dongle work, or am I right in my assumption that it won't work, and an additional analogue to digital converter would be needed?

Chris

**O** Yes, you're right. All the cheap adaptor plugs do is connect the appropriate pins on the VGA connector to the analogue RGB pins on a DVI-I socket.

By definition, an actual video format convertor won't give you any better quality than you'd get by using straight VGA. Actually, you'll lose a little image quality, and there might be refresh rate weirdness as well.

The converters are just so you can connect something with a VGA output to something that only has digital DVI input. The setup you're using already is the best you're going to get (and, actually, will probably look just as good as if your laptop had a digital DVI output). So don't worry about getting a converter!



The analogue pins are on the right of the DVI-I socket.

## 100BaseT audio

I was wondering what you think about this very cheap DIY speaker cable

Cat 5 cables: [tinyurl.com/3UR9B](http://tinyurl.com/3UR9B)

Do you think it might work?

Will

**O** Would it work? Sure. Would it sound any better than any other speaker cable of reasonable diameter? Nope.

This design is, presumably, based on some idea about induction or capacitance or skin effect or something, making the usual audiophile mistake of assuming that things that happen in the megahertz (or gigahertz...) range also happen to audio frequencies.

This stuff's been chewed over at very great length by people who know little about electronics, and at far lesser length by people who do and who can therefore rule it out as irrelevant and move on.

Better people spend time doing macramé with computer cables than spend zillions of dollars on snake oil wires from voodoo salesmen, though.



It's all because of some secret government plot, I tell ya!

Danny

**O** Colorvision's current products [www.colorvision-lasers.com](http://www.colorvision-lasers.com) look very impressive.

Unfortunately, no progress seems to have been made in getting these things down out of the US\$100,000 price and refrigerator size classes. The scanner hardware in them (super-fast polygonal mirrors and/or badass DSP gear) is probably the big obstacle; blue diode lasers of reasonable brightness (as opposed to the 10-watt-plus lasers in the big projectors, which are far too powerful for home use) are also a problem at the moment.

A simple laser projector would also give a strange twinkly image, thanks to the reflected light interfering with itself. You can see the same

'graininess' in a laser pointer dot. Either the big manufacturers have a solution for this, or it just isn't noticeable on a huge screen at a large distance.

## Vanishing URLs

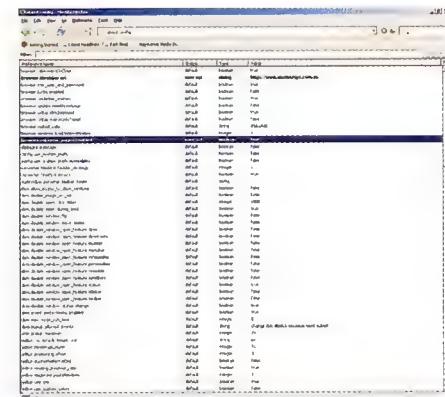
When a website times out in Firefox, you get a stupid pop-up error box, and a blank browser window with nothing in the URL bar, so you can't easily retry the request.

There doesn't seem to be an extension that fixes this. Can it be done?

Kevin

**O** Yes, it can.

Type 'about:config' into the address bar, type 'error' into the Filter box above the big list of config options, and you should be left with only the '**browser.xul.error\_pages.enabled**' option visible. Double-click it to set the value to 'true', and your problem will be solved.



Firefox, faster than a speeding configuration dialog!

## I/O OF THE MONTH

### Power pickle

Onboard sound has been a bit below par in the last year, but MSI have put a Creative chip on their newer boards, which is great news.

The K8N motherboard family has a power supply issue, though, as quoted from the manufacturer's website: 'For this model, you must use a power supply which has a -5V pin supply.' Without the -5V rail, the onboard sound won't work.

This -5V rail is not included on many newer 24-pin power supplies. What power supply will work?

Ben Wu

**O** The -5V rail dropped out of the ATX spec a while ago, and now a lot of big-brand PSUs either don't have that white wire

going to their main connector at all, or don't have anything connected to it.

You can still find PSUs with -5V rails, though. Various Topower models ([tinyurl.com/CT434](http://tinyurl.com/CT434)) are locally available, and have -5V. They have 20-pin connectors but some, like the 626P6, come with a 24-pin adaptor.

You can plug a 20-pin ATX connector straight into a 24-pin EPS12V socket, too; the four pin-holes you leave empty are an extension of the ATX12V idea, and just duplicate other rails to give lower

resistance. If the PSU is grunty enough, such a setup should work OK.

The Topower 626P6 is rated at 520W, which ought to do you. It also has trim-pots for the high current rails, so you can goose them up a tad if higher cable resistance robs you of a few tenths of a volt.



The -5V rail isn't quite dead.

# hotbox

The best reader-submitted custom made boxes every month!

Welcome to Hotbox! Each month you'll find the winning Hotbox of the month and runners up as voted for online at [www.atomicmpc.com.au](http://www.atomicmpc.com.au). Want to win? Submit your box now!

## Lupin's Lupinator

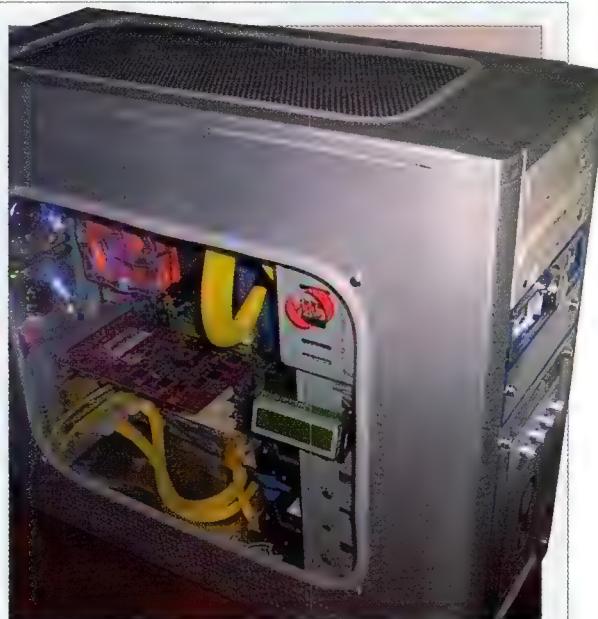
It began with one of those lovely beige boxes we all know and love. The first mod was to cut the window. Then it was time to move to the inside. I have done my best here to hide as much of the wiring as possible and what can't be hidden was covered with yellow UV sleeving. A piece of polished stainless steel was added to the bottom. I then attacked the top, installing a large metal grill to let all the heat escape. A Thermaltake Volcano 7 takes care of the cooling duties, with four case fans added just in case. A Dick Smith programmable LCD displays important information as does the Nexus super panel. All up it has taken around six months working on and off to get it to this stage.

Lupin



### technical details

- AMD Athlon XP 1800+ @ 2400+
- 1GB DDR333
- Gigabyte GA-7VT600 1394
- PowerColor R9600XT
- Seagate 80GB HDD
- Seagate 60GB HDD



## Renato's Intimidator

Sick and tired of having overclocking as my only option to play new games at reasonable detail and speed, I wanted to have something that would actually last me six months!

First I bought a Sunbeam clear acrylic midi case, and assembled it immediately. Next I had to organise all the parts, which was not an easy task, especially the power supply! Since I had all necessary dimensions of all components, I stayed back after work to mod the case in the workshop with an air-grinder by hand, and while at it, cut the holes for the four 12cm fans into it as well. This was done over a period of three weeks – what can I say, I am a slow worker!

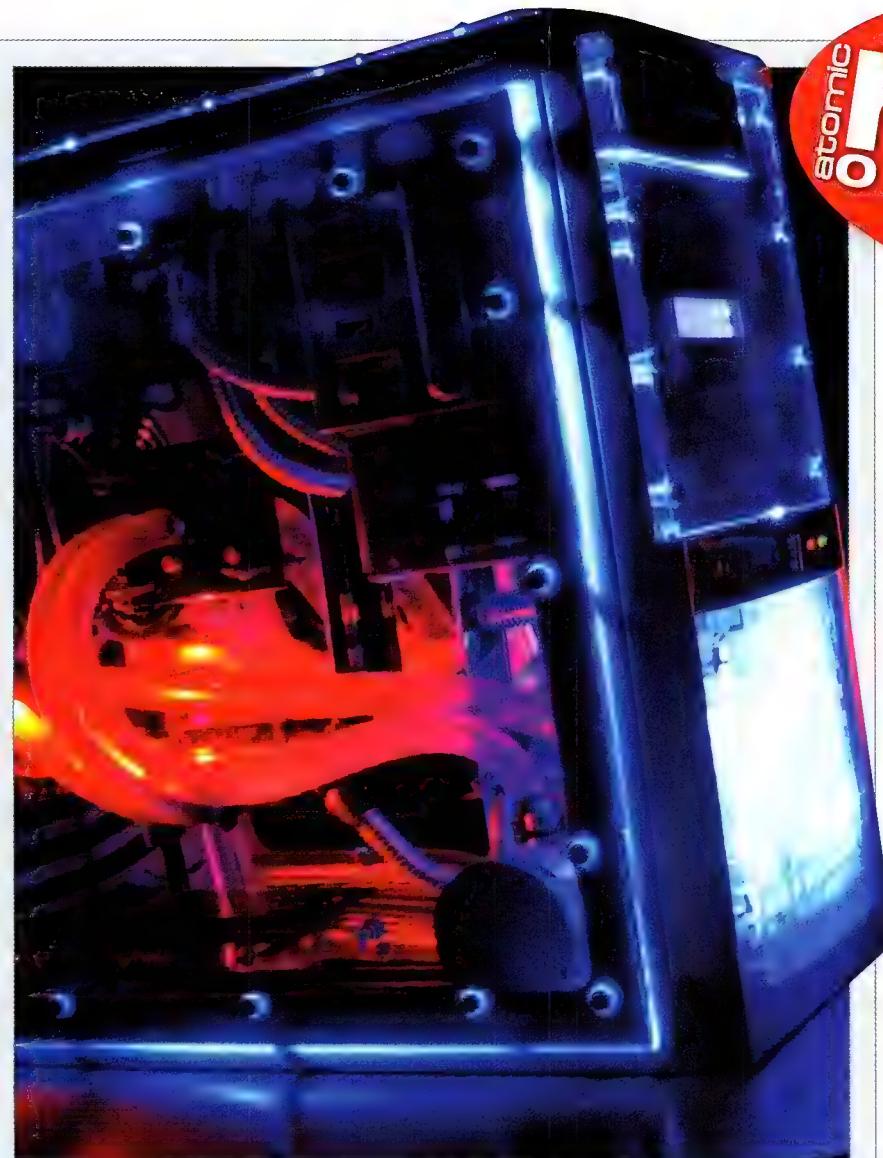
Renato



### technical details

- Sunbeam Acrylic midi case
- Dual AMD Opteron 252s @ 2.6GHz each
- TYAN THUNDER K8WE S2895 mobo
- 2x ASUS NVIDIA 6800 ULTRAs in SLI
- Sound Blaster Audigy 2 ZS
- Western Digital 200GB HDD





#### technical details

- Intel Pentium 4 3.0GHz @ 3.6GHz
- 2x 512MB DDR400
- Sound Blaster Audigy
- Sapphire RADEON X800 PRO ViVo Toxic
- Matrix Orbital
- 550W TruePower PSU



## Zakstar's PC

My dad brought me a new Super LANboy – that's my favourite case – and he got some thick clear plastic and cut and bolted it to the sides and the top of the case. Then he made some water tanks for the side. We made some special lights that plug into the back of the case and I can swap them around if I want red or blue lights. Dad made a box to hide the motherboard using some special mirror plastic that I picked, and he cut the holes and made it fit over all the parts and made some for the back too. He put some water cooling parts and a radiator with a fan on the back so it runs very cool now and it's very quiet. It gets 25,000 in 3DMark. I really love my new PC and my Dad.

Zakstar

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- A detailed list of the machine's specs.

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## WIN! Adobe Photoshop & Illustrator CS 2! Worth \$1998!

*The demon was modeled and rendered with 3ds Max and the composition and background was done in Photoshop. The inspiration for this picture was fantasy games such as Diablo and Warcraft.*

- Paul

Create the winning Artomic and get the latest versions of Photoshop and Illustrator, valued at **\$1998**, from **Adobe**!  
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# MacGyverisms!

To enter, go to [www.atomicmpc.com.au/competitions](http://www.atomicmpc.com.au/competitions). You can only enter once per competition or you'll be disqualified. You must provide a postal address and phone number for prize delivery when you enter (not a PO Box).



## MacGyver: The Complete First Season box set

Aye, it's MacGyver, and he's back with a vengeance. The undisputed master of making something from nothing returns after a 20-year leave of absence. Join MacGyver as he disarms, builds, destroys and escapes from all manner of things using raw ingenuity and a roll of duct tape. Thanks to Jade at Paramount ([www.paramount.com](http://www.paramount.com)) for supplying us with a box set of this unbelievably sweet giveaway.

In the first season episode *The Enemy Within*, what item did MacGyver make using candlesticks and electrical cord?



## 6x Dodo broadband ADSL packs

The internet! Isn't just the most fantastic thing ever, at least since the invention of fire or the turnip steam cooker? When you think about it, the only thing that isn't great about it is how slow it can be without broadband. Yeah, broadband. So, the kind people at Dodo Internet have provided us with six ADSL broadband packs to give away. The packs include an ADSL modem, line filter and 250MB of downloads, as well as other stuff! Props to Anastasia at Dodo ([www.dodo.com.au](http://www.dodo.com.au)) for these awesome packs!

What is the maximum speed of ADSL at the ATM level?



## 3x Razer Diamondback Plasma Limited Edition optical mice

Ever seen a cat in a hat or a frog in a bog? How about a line of text about two animals in precarious situations involving clothing or peat? Well, you just did. Now, you can have a mouse in the house – a brilliant, high-resolution optical mouse that is. Get the latest in precision mousing technology right here with this awesome giveaway involving you, us, and three Razer Diamondback mice! Cheers to James at PC Case Gear ([www.pccasegear.com](http://www.pccasegear.com)) for these spectacular pointing devices!

What made Honeywell's optoelectronic mouse unique?

To enter visit [www.atomicmpc.com.au/competitions](http://www.atomicmpc.com.au/competitions). The closing date for entries is 14 September 2005. Winners will be announced in *Atomic 58*.

Atomic 54 winners: 2x Geil iBalls Q. What is the name of the lead singer of Evanescence? A. Amy Lee. A. Bolin, Keiraville, NSW. D. Ortado, East Ryde, NSW. 10x Belkin SurgeMasters Q. What is the most common cause of a power surge? A. Heavy electrical equipment being turned off – for example, an elevator. K. Lee, Dianella, WA. B. Zimmerman, Southport, QLD. M. Whitney, Roma, QLD. M. Plavins, Valley View, SA. H. Mac, Salisbury East, SA. K. Poole, Bardon, QLD. D. McGregor, Yass, NSW. S. Nicholson, Alice Springs, NT. S. Abela, St. Albans, VIC. Lac, Sunnybank Hills, QLD. 5x copies of God of War for PS2 Q. What metal were the chains that bound Prometheus made of? A. Adamantine. A. Sutton, Nanango, QLD. P. Harvey, Brisbane, QLD. J. McGraw, Einneo, QLD. J. Barker, Belmont, VIC. R. Fesus, Wollongong, NSW.

Terms and Conditions of Entry. 1. The promoter is Haymarket Media of 52 Victoria Street, McMahons Point, NSW 2060. Promotion period is from 9.00am on 10.08.05 until 12.00pm on 14.09.05. 2. Entry is open to residents of Australia and New Zealand. Management and employees of Haymarket Media and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to Haymarket Media. 4. The draw will be held at the offices of Haymarket Media at 5.00pm on 14.09.05. Winners will be notified by mail and published in *Atomic 58*. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of Haymarket Media.

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...who is your favourite superhero?

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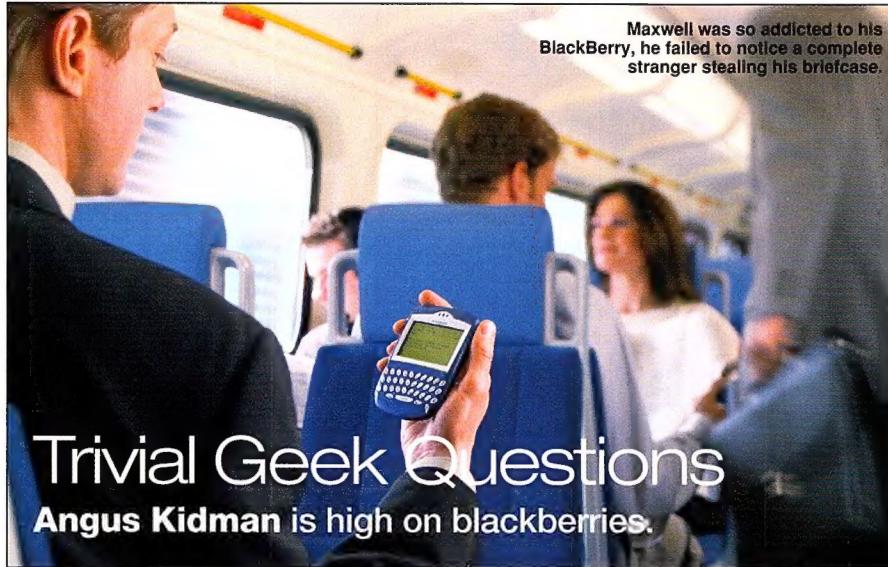
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# websight

Online, community, and making fun of stuff because we can



Maxwell was so addicted to his BlackBerry, he failed to notice a complete stranger stealing his briefcase.

## Trivial Geek Questions

### Angus Kidman is high on blackberries.

Welcome to Trivial Geek Questions, the advice column that's an intriguing mixture of HyperThreading, Gigabit Ethernet and Super Nanny. If there's a problem that you can't solve via a quick search of Google and it's too embarrassing to ask your grandmother, maybe we can help. Submit your questions to [tgq@atomicmpc.com.au](mailto:tgq@atomicmpc.com.au) or via [www.atomicmpc.com.au](http://www.atomicmpc.com.au).

**Q** I've recently gotten a BlackBerry for work, and frankly the thing is more addictive than top-grade narcotics. It's almost impossible to resist the urge to check emails during long and boring meetings, especially when every other person there seems to be doing the same thing. What are the rules for well-mannered BlackBerry usage? And what can I do to ease my addiction?

**TGQ** TGQ doesn't like to be judgemental, but it seems to us that BlackBerry usage is sweeping the planet like the plague (OK, there are fewer rats). You can't move at an airport or conference without seeing someone madly twitching their thumbs to check 'just one more message'. The numbers bear that out: in the first three months of this year alone, nearly 770,000 of the email-on-the-run boxes were sold across the world.

Given this level of popularity, you would hope that at least half-a-dozen people would have been able to work out the (fairly obvious) rules involved in using the device. Yet clearly this isn't so – as this letter attests – so TGQ

reluctantly offers this guide.

It's rude to read or write email while someone is talking to you. That knocks out using your BlackBerry in meetings, interviews, on dates, or when having sex. (If you've never talked during sex, there's a whole other set of issues we'll have to tackle another time.)

It's dangerous to read or write email while driving. On a recent trip to the US, TGQ was astonished by the number of people with one hand on the steering wheel and their eyes firmly on their BlackBerry. Hopefully all the offenders have died in car crashes by now.

When you get home, switch it off. Most BlackBerrys have been deployed in corporate environments. Unless your contract specifies that you are being paid for every single hour of the day, switch the damn thing off.

With all that said, TGQ would be the first to admit that many work-related meetings are considerably less interesting than watching concrete set, and even less productive. However, the solution isn't to start sending emails to everyone in your address book. If you can afford to ignore everything that's being said in the meeting, what are you doing in there in the first place?

As for dealing with your addiction: take a long, hot, steamy bath (one location where using your BlackBerry is definitely not advised). If that doesn't work, go to a local seedy bar and get somebody to break your thumbs. That'll fix you.

## atomican

[www.atomicmpc.com.au](http://www.atomicmpc.com.au)

In the *faaaabulous daaaaahling* world of television, the Green Room is an off-screen oasis where celebrities and wannabes park their privileged personages prior to going on air.

But *Atomic*'s Green Room ([www.atomicmpc.com.au/forums.asp?s=1&c=1](http://www.atomicmpc.com.au/forums.asp?s=1&c=1)) is a stage. And you'll see more interesting personalities performing there than a live telecast of *Ripley's Believe It Or Not*.

For example, Emperor\_Matej\_I. He's a rightwing vampire with a fetish for witch king helmets and pineapples. Stranger still, he recently emerged, not from a coffin, but from the closet.

Then there's forum moderator, Moz. He's a mild-mannered werewolf with an unfortunate penchant for crapping in his handler Hulkster's slippers. He's usually tame enough, but when the moon is full ... well, let's just say he needs a *fuller* Brazilian than a gay Greco-roman wrestler pre-mardi gras.

And Mills – he's channeling the ghost of Sergeant Schultz. But while he claims he sees *nu-zing*, hears *nu-zing* and above all knows *nu-zing*, he does seem to perk up whenever lesbians or beer are mentioned.

Inebriated German lesbians are advised to keep a safe distance.

And then there's Juggalo Scrub, the forum's fearless agent provocateur. He loves a good argument... though a bad one will do. Count on Juggs to tell it like it is – even when it isn't – as long as there's an entertaining stoush in the offing.

You don't need to be a celebrity to mingle with the menagerie in the *Atomic* Green Room. Just get yourself a subscriber number or Green Code, and be yourself. (Or maybe, someone else!)

– Virt

## potm

Unfair Dismissal Legislation: The Employer's Perspective  
By Emperor\_Matej\_I

[www.atomicmpc.com.au/forums.asp?s=1&c=1&t=67623](http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=67623)



The good Emperor has opened the doors to a typical *Atomic* debate. The thread is kicking along with gutsy point and counter-point. All highly spirited, yet tempered by informed opinion. Well, mostly anyway. We're all learning, and having so many intelligent opinions going at it here is as entertaining as it is rewarding.

The extra good news for Emperor\_Matej\_I is that this month we transition to the new **MX518** for Post Of The Month. Sweet sweet on-the-fly DPI adjustments. Enjoy, Emperor!

## Of skateboards and overclocks

### Maurice 'Moz' Ford's middle name is really 'Danger'.

I found the most perplexing device at work the other day. I was standing in a large, flat, vacant block of land. The only thing on it was a massive stockpile that must have stood over 10 metres high and been close to 45 degrees in slope. It was strewn with jagged rocks, the type your mother warns you not wear your best clothing near. It looked to be a suicidal plummet from the top, and yet at the bottom was evidence that someone was insane enough to attempt it – a skateboard deck, minus the wheels.

The owner of the deck was obviously intelligent enough to realise that because of the steep drop, staying onboard would prove almost impossible, so he did what any sensible lunatic would do. He nailed his sneakers to it.

I checked the area for blood, torn fragments of new clothing, or bone chips, but found nothing. I could only assume our less than sane hero went home victorious for a change of shorts.

Now although the thought of risking my life has dulled with age, I still risk something that I hold even dearer to me almost weekly – my PC.

Every time I tweak, mod or change the settings in my gaming beast, I go for gold. No half-hearted

attempts here. It's all or nothing. I have a motto, usually uttered while under the influence of too much caffeine: 'This is either gonna fix it, or fuck it!'

I'll let you guess how my odds have been. Ignore the number of new component boxes in my cupboard.

As an Atomican, you must be at least a little like this. The rush induced by riding your pushbike down a steep hill with no brakes and no helmet

replace the family pet due to the sucking horror that is an OC'd fan?

Then of course, there are the problems with heat. Fire is always a danger. My water cooling setup is designed to double as a sprinkler system in case of a 'Flamer', an event that is as spectacular as it is expensive. (It's only been deployed once and I'm still upset that I didn't get photos.)

There are the less common dangers that only the hardcore face. There is always the chance of meltdown and severe fallout if one of your more adventurous overclocking experiments goes awry. OK, so your neighbours are now glowing green zombies? Hey, it's the price you have to pay for those extra 50 benchmark points.

And so what if the space-time continuum is disrupted when you finally top 300fps in Doom 3?

### Let's face it – overclocking and modding just isn't fun without some personal risk.

simply cannot compete with overclocking a brand new, top-of-the-line video card to the point where it may actually burst into flame and burn your house down. There is no contest.

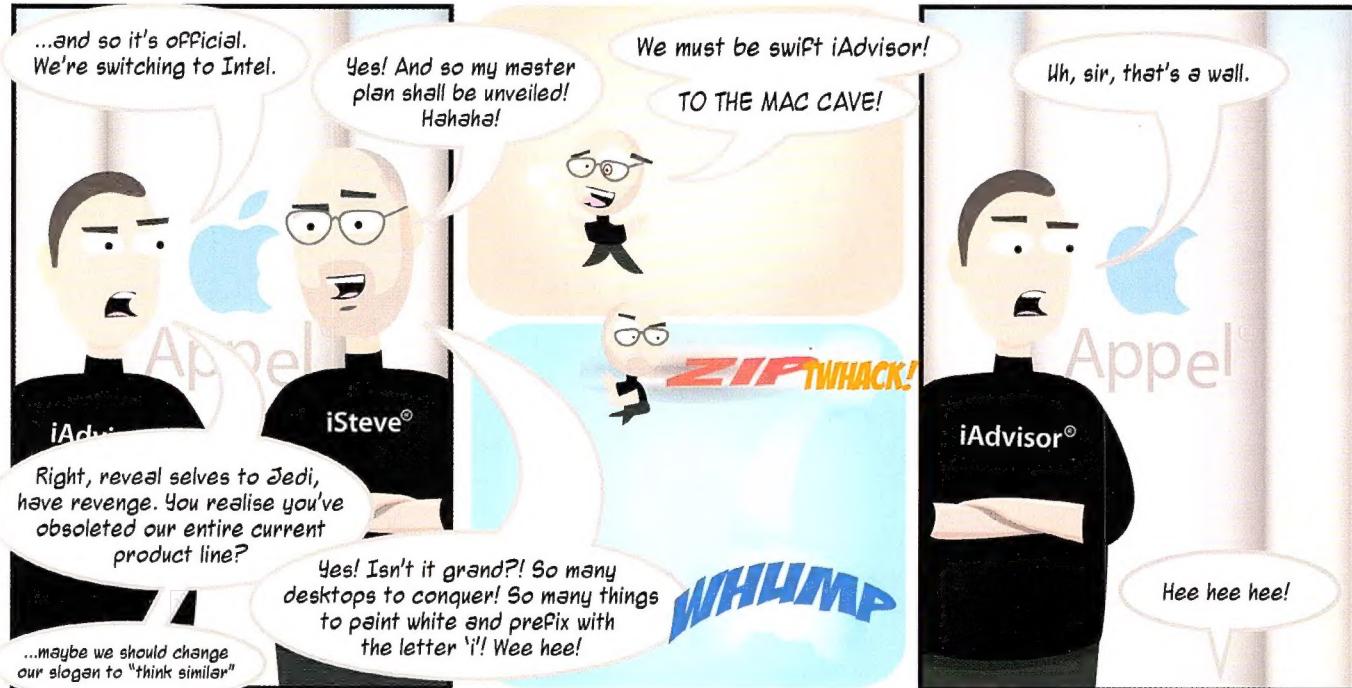
Let's face it – overclocking and modding just isn't fun without some personal risk.

There are the simple dangers such as those brought on by turbine-like cooling fans. Who can honestly say they haven't had a touch of industrial deafness, lost a digit or even been forced to

If you want to make an omelette, you have to break a few eggs, right? (Did everyone bitch at Newton when he pushed a few recalcitrant colleagues off a cliff to further his studies of gravity? I don't think so!)

I believe that we should embrace our daredevil natures and be the best that we can be. PCs are not meant to be quiet, cool or environmentally friendly. If you don't have the EPA knocking on your door every second day, then you're just not *Atomic*. But remember to take out insurance on your pets.

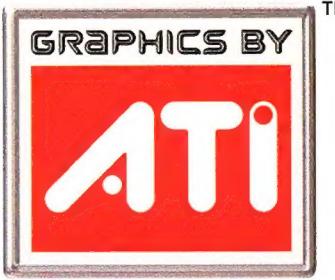
### Crashtest #29 - "He Knows What He's Talking About. Trust Him."



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